In addition to the papers and lecture, the report of the Research Committee will deal with the question of Pipe Standards, referred to the Committee at the last meeting, and with other subjects that should give rise to a good discussion; and there will be an interesting report from the Committee on Uniform Accounts. During the days of the meeting all the announcements will be posted on the bulletin boards at the headquarters and meeting hall. All members are warned to take notice thereof accordingly. All members attending the meeting are particularly requested to wear their membership badges in plain sight, thereby greatly aiding the officers and the local committee in their work, by affording a ready means of recognition.

In order that the "Year-Book," containing the report of this meeting, may be published and issued to the members immediately after the meeting, notice is hereby given that, if any of the speakers at this meeting desire to correct their remarks before they are printed, they will be given an opportunity before leaving New York city, but not after. The stenographer will have typewritten copy of the principal discussions prepared at the headquarters between the sessions of the meeting, and all those who desire to correct their remarks must notify the Secretary at the close of the session at which such remarks are made, as all the reports will be turned in to the printer immediately after the adjournment of the meeting.

[Here follows a detailed statement respecting the special rates for transportation—one fare and one-third, going and returning by the same route—that have been promised by the named Passenger Associations. These include the Trunk Line Passenger Association, the Central Passenger Association, the Western Passenger Association and the Southeastern Passenger Association. This series virtually means that any member of the Association may avail himself of the shortened fare under the certificate plan.]

*Special.*—The entertainment as now planned will include for the ladies a carriage ride on one afternoon and a theater party on the evening of the banquet. For the members there will be provided a banquet at the New York Athletic Club on Thursday evening, and parties will be organized to visit the various gas works, or some of the large electric power stations, or both, on Friday, and if possible an inspection will also be made of part of the work on the underground railway now building in New York at a point where this work has been practically completed. You will be notified later of the price of the tickets for the banquet and other entertainment.

Be sure to obtain a railroad certificate when buying your ticket for New York. The greater the number of certificates handed in, the easier it is to get the reduction in rates for future meetings, since the railroad officials count the certificates turned in as marking the full attendance. In our case the number of certificates is from 50 to 100 less than that of the persons in attendance, and our requests for lower rates are not given the consideration they should receive. Apply for ticket and certificate at least 30 minutes before train time. Each person must sign his own certificate at time of purchasing tickets for New York. Be sure to hand the Secretary your certificates, accompanied by 25 cents for each one, as soon as you reach the headquarters. Apply for return ticket at least 30 minutes before train time, and have your certificates with you. All persons, ladies included, attending the meeting are entitled to the reduced rates from the territories named. Members will please hand their certificates to the Secretary or his clerk upon arrival at place of meeting. If there are 100 members present, holding certificates, each certificate will then be properly indorsed and handed back to the owner before adjournment.

Any members having questions which they desire to put into the question box should send the same to the Secretary as soon as possible, in order to give him an opportunity to have them printed and distributed to the members before the meeting, so as to secure for them careful attention.

ALFRED E. FORSTALL, Sec'y.

## BRIEFLY TOLD.

NOTES.—

AT 3 P.M. of Wednesday last a serious accident occurred at the works of the Williamsburg station of the Brooklyn Union (N. Y.) Gas Company, which resulted in the loss of five lives. The Company had some time ago awarded a contract, to Messrs. Bartlett, Hayward & Company, of Baltimore, for the construction of a gasholder, to rest in a steel tank, the rated capacity of the vessel when finished being put at 5,000,000 cubic feet. The holder was to be constructed on a plot of ground owned by the Company at North 12th street and Wythe avenue. Work on the tank had progressed to the point of the completion of the floor—the tank was 192 feet in diamater—and the task of lowering it to the foundation bed was underway. The work was proceeding in the usual manner, when, without much warning, the mass of metal shifted and dropped to the surface—it was at a height of 26 inches from the ground Five of the workmen were caught and killed. Pending the results of the investigation now going on it seems preferable to await the results thereof rather than to advance theories or opinions regarding the unfortunate affair. If we mistake not, the accident is unique in the annals of gasholder construction in the United States.

MR. W. S. BOWEN, formerly Superintendent of the Newport News (Va.) Gas Company, has been elected President of the Green River Coal Company, of Washington. He will have the active management of the Company, and he has for associates capitalists well known in the coal development of the Pacific Coast.

[OFFICIAL REPORT—REVISED BY THE SECRETARY.—Continued from Page 298.]

## PROCEEDINGS, TENTH ANNUAL MEETING OF THE PACIFIC COAST GAS ASSOCIATION.

HELD IN THE ROOMS OF THE PACIFIC GAS IMPROVEMENT COMPANY, SAN FRANCISCO, CAL., JULY 15TH AND 16TH, 1902.

FIRST DAY.—AFTERNOON SESSION.

*Discussion of the paper*[1] *on*

GAS ADVERTISING,

by Mr. R. P. Valentine, of Sacramento, Cal.

The Chairman—Mr. Valentine's paper is before you for discussion.

Mr. Keyes—I notice Mr. Valentine says that Mr. Britton does not favor using cuts. My information has been, if I am correctly informed, that he does believe in them, and has cut the price considerably on his stoves—from $15 to $7.90.

Mr. Britton—I was about to take exception to that remark of Mr. Valentine's. I would say that it depended upon the kind of cut, as to whether I favored it or not. I do not refer to the same kind of a cut that you do. It seems to me, Mr. President, that gas advertising is like everything else in the gas business. It is a local proposition largely, that the character of the people you have to deal with and the conditions under which you are selling gas control the character of advertising. I think most gas superintendents make a mistake in trying to be their own advertisers. Not one man in 10,000 is fitted to write an intelligible and intelligent "ad." for a newspaper. Our custom in Oakland for some years has been to employ well-known "ad." writers. They are newspaper men; they know what the public wants in the way of attractive reading matter; they consult our gas stove saleslady and the different officers of the Company, and so write up, almost daily, new "ads." that are attractive, that appertain to some local or national happenings, that would create a heading that would attract attention at once. That makes the best advertising matter. Then, again, liberality is one of the greatest factors. The stinginess of some people in the matter of advertising prevents them from making any money out of it. A 1-square "ad.," or an inch "ad.," in a corner of the paper will not pay. A half-column or quarter-column in an attractive place will pay; but I believe most of the gas people have been educated up to the proposition of being antagonistic to spending a great deal of money on newspapers. That is a great mistake. I believe newspapers generally want a great deal of money, and generally get it, and they ought to get it. I believe gas superintendents and presidents should be liberal patrons of the press in every way, shape and manner, because they can get it back a thousand fold; and if they don't, they get it in the back of the neck, a thousand fold also as a rule. I believe also in following out my own policy, in separating the business of the gas stoves from the office of the company. We tried the experiment of incorporating our gas stove department in our office for about two years, to the detriment of both ends of the business. I believe the little sum paid for the rental of a store away from your office, handsomely fitted up, having sample kitchens and sample bathrooms for the display of your different appliances, is more profitable in the end; decidedly so. You take the atmosphere out of your office. If your saleswoman in the corner of your office is trying to make a sale to someone, and a woman consumer steps up to the counter with a bill that is this month four times larger than it was last month, and she has a saw-filed voice, she will kill all the sales of gas stoves that are within the reach of her voice, and she will sow microbes that will grow up into big bugs the next time she comes to the office. As to demonstration, I believe no gas stove should be set up in a house without immediately afterward the demonstrator goes from the office to the house to properly explain its workings. People I know, to whom I have talked, wonder why when gas stoves are placed that the revenue is small from them, but they will find as a rule that the trouble is the party does not know how to use the stove. They have tried to light the oven burner once and it went back on them, or the top burners get dirty and greasy from things boiling over, or the dustpan beneath the top burner is so fixed they cannot pull it out to clean it, or they do not understand how to regulate the heater. Where these things are properly understood the stoves will certainly yield a good income. But I think we are all too stingy; that is my judgment. I never found a gas man yet who was finding fault with his sales of gas, either for fuel or illuminating, who was not stingy, who was not afraid to spend a little money in some way

1. For the text of Mr. Valentine's paper, see JOURNAL, Sept. 1, page 296.

to get a great deal of money back. Mr. Keyes mentioned the fact of my selling $7.90 stoves. I want to give you some arithmetic in that regard. I sold 485 stoves in approximately 3 days at $7.90 Assuming that I lost $10 apiece on those stoves, and that they cost me $17.90 to put up, I am out $4,850, or even $5,000, on the number mentioned. You may be sure that each one of those stoves will burn 1,000 feet a month. You can also figure that the profit per 1,000 will be a certain amount. I will not give away any shop figures, but you can figure it yourself. And if you are able to figure how in any month I can lose any money by giving away $5,000 in stoves, you are poor mathematicians. And you should apply that same rule to yourselves. Give away a little money to your customers and it will come back a thousand fold, no matter how you give it away. It is a dead cinch you cannot lose any money on the game. And if this Association could instil into its members the idea that the great thing needed in the management of a gas works to make it successful is liberality, you would all come here next year, I think, and be perfectly willing that your dues should be raised to $10 per annum, you will have so much money.

Mr. Lowe—I don't think Mr. Britton has said half enough. This little experience of his, explained last night, was really very interesting. It seems he had a great number of old, back number stoves, also a great number of first-class, up to-date articles. He advertised that as long as his stock of stoves lasted any stove in the house would go at $7.90. The result was the first people coming got the best stoves. The tailenders got the absolutely dead stock, but he got his money back right then and there from those stoves, as people were very glad to get even them. I don't believe in the policy of giving away stoves. I have always been opposed to it, for I have had many years experience in it. My experience has been if you give a gas stove to a customer outright he will not appreciate it, but if he has that little financial interest that Mr. Britton has introduced in his $7.90 article, it is sufficient for the consumer to appreciate it and take care of it, just as much as though he had paid $20 for it. I think it is the cleverest scheme I ever heard of. I was in a little town in this State recently where there are opposition gas companies. One of the companies advertised in the newspapers as follows: "Gas Company's office next to post office." There was no name attached to the "ad." at all, as they only recognized one gas company in that town, and that themselves I thought it was very clever. It also showed very excellent judgment in the choice of the location of the office. Mr. Britton speaks wisely in regard to the choice of a separate store, but that cannot apply to the little fellow who cannot afford to pay separate rents. I think it is all important that the choice of a location be very carefully looked after, and that you then have the right kind of a store, as appearance cuts a great deal of figure. Again, you must have your stove so displayed that a person in stepping in to pay his bill must pass by your display of stoves, and see that they are always attractive and clean and ready to light, and see that a person goes out understanding something about a stove, and not kicking about it. I do not believe in having a customer call at the cashier's desk, and if he wants to look at a stove go behind and look at one in a crate. I think the stove should be placed attractively in front, and the customer be compelled to go past the stove before reaching the cashier's desk. (Applause.)

Mr. Osborne—A short time ago, while engaged in conversation with with some gentlemen at a hotel, I discovered that one came from Milwaukee and the other from Cincinnati. Naturally after a while our talk turned on the gas business. They were consumers, and I was surprised to discover how much they knew about what was going on in the gas line in their towns. And much of the reason of it, as far as I could discover, was a special notice in red ink on the back of their bills gave notice of any little new feature in the business. For instance, the Milwaukee gentleman told me that they had noted a crowding at the counter and the ladies were pushed aside. They now have a special office for the ladies, and they announce that fact on the back of their bills. I was very much astonished at how much they knew about what was going on for ordinary consumers in large towns. It appealed to me as a good thought, and I have introduced it in my district. I have found it too often the case that we are too anxious to get out stoves, and do not look after the consumption sufficiently. A stove is of no use to us unless it uses 1,500 or 2,000 feet of gas at current prices, and we must look to the consumers to see that they consume that amount of gas, or that they use the stove enough so that there is the necessary consumption to pay our fixed charges. I have introduced the idea in every hardware shop in our district of having a sample of our stoves, and we make an allowance to them for every stove that they set for us, or come and get from us. I would like to see a paper this coming year on the question of what is good business in selling and advertising stoves. Some of us are running services and fuel runs free, and selling stoves at cost. Others charge for services and fuel runs, charging a profit to the stoves. Others run services free and fuel runs also, selling stoves at half their cost. Now, which is the most remunerative to the company? I trust next year will bring out a paper dealing with the question as to which is the best plan for companies to pursue from a business standpoint.

Mr. Gutsch—I would like to ask if Mr. Britton expects, in due time, to start another boom of the kind he has mentioned? It seems to me it would be more advisable to follow a steady rate and policy in dealing with the public, so they may know just what to expect. People now on the list will feel very happy because they got in just in time, but people who come in after will feel rather unfortunate in being compelled to pay the regular price for a gas stove. It seems to me if these booms are kept up, at times selling stoves at cost or less than cost, when the regular price is asked it will have the effect of discouraging people who will wait for an opportunity to get a bargain.

Mr. Britton—My experience over a good many years is that people don't mind bargain sales at all. They don't mind them in dry goods stores or other kinds of business at all. They are means of advertising, and they so regard them. I don't know how the spirit will move me next. I am a good deal like the old fellows who go to experience meetings, stay until they get under the influence, and then get up and do something out of the ordinary. I remember the last boom I had over in Oakland was a proposition to give away $15 gas stoves upon the payment of $20, and the rebate of $15 of that sum in gas. I sold some 800 stoves on that plan; and I think there are some 200 of those accounts still not closed, where the $15 has not been absorbed, and we are still holding the people's money and giving them gas for it. That was some 2½ years ago. I do not find, since the sale stopped, that it has interfered with regular sales, and some gasfitters around town tell me they are having a boom in stoves at the regular rates, and they thank me for it. I do not think people feel badly at all about a reduction in prices. They simply regard themselves as unfortunate that they did not get in in time, and they will be careful to come in at the right hour next time; but it will not in my judgment prevent the sale of as many stoves as would have been sold in the ordinary course if you had preserved the regular price. I want to hear from my friend from the valley, where the water falls perennially, Mr. Aldrich. I know he has some original ideas.

Mr. Aldrich—It is patent to all of us that the papers read here are of the utmost interest, and one which touches the very head and front of our business is the very practical paper just read by brother Valentine. You can tell by the discussion we have had so far that it is something we are all interested in and that we can all add our mite to, and I have to thank him for the pains he took in preparing this paper for us, although I regret at the same time, Mr. President, that he omitted, in common with the other scientific gentlemen in this meeting, the other half of our business. Although the calorific value of gas is becoming very great at the present time, I have yet to learn that the illuminating part of it is a thing of the past. With reference to this gas advertising business. Brother Lowe spoke to me in the meeting this morning just as I came in, and even astounded me with the hint that the great Oakland Gas Company was selling all kinds of stoves for $7.90. I thought I would drop dead. I must say, seriously, that of all the bad business I ever heard of or read of for some time it is "Johnny" Britton and his 485 old, antiquated stoves at $7.90 eaeh. (Laughter.) I made a few figures while our friend was speaking. We will estimate that Mr. Britton pays $13.50 for his stoves, laid down at Oakland; say any kind of stoves. Now, then, suppose a fellow has not a service in the house. "Johnny" puts it in for nothing, and with the cost of setting up that stove his investment amounts to $23.50. Now, I want you to go back into the privacy of your chamber and on your knees do a little more figuring, and then tell me when the time will come that you will return anything to your stockholders for the amount of your investment. I am not here to tell what we do where I come from, nor where you come from. We must take the papers and discuss them. "Johnny" sold his stoves for $7.90. (Laughter.) If "Johnny" was in Frisco he would be selling gas pretty cheap; wouldn't he? But I will just guess that it cost him 25 cents to make it, and I will guess that outside of advertising it cost him another 25 cents to distribute it. If I am wrong I will be corrected later on.

Mr. Britton—I will correct you later.

Mr. Aldrich—Now, then, "Johnny" has his gas distributed at 50 cents a month. He would consider 1,000 a month a fair average. He would expect $1,000. Now, I see that with the stoves at $7.90, and about 32,000 feet of gas at 50 cents per 1,000 is equal to $23.50. That is

the amount of "Johnny's" investment. It will take him 2½ years before he gets his money back. If I gave such a proposition as that where I came from I would soon be tackling "Johnny" for a job. That is all I have to say with reference to this proposition. Gentlemen, with reference to this advertising matter, I tried a little scheme, as brother Britton suggested awhile ago, charged $25 for stoves and gave with them 12,500 feet of gas, and advertised the proposition very liberally. The results were immense. After a month's advertising I sold less than 100 stoves. I say here, that you have no right to sell a thing for less than it cost. Gas companies do not conduct bargain counters. If you are selling gas at the cheapest possible rate consistent with your duty to your stockholders, you cannot afford, and you have no right to, and should not, give away anything that is in your stores. This last month I gave another bargain day. I said I would for $24 set up a 15-inch range, and an 18-inch range for $28, and put in free service at the rate of $2 down, and $2 a month; that is all. If they had a service in I would charge them $21. In 2 weeks I cleared out every range I had in my place. The surprise is to me that out in this California country every house has not its gas stove; that every house that is built has not its receptacle in a room for the gas stove to the elimination of every wood and coal stove in this country. That is what I think about it. I have been taking my daylight fuel business with my night business, and I find that for 30 days, ending 2 days before I came here, I am selling 51 per cent. for fuel gas. Now, I think that is not so bad for our climate, and I doubt whether in Los Angeles you are selling very much more. The thing is to have a fine display. I have a fixture room, and I venture to suggest that no other gas company in the United States has one like it. It is a dark room of very elaborate proportions, which cost me nearly $2,000. It makes a very attractive and beautiful appearance, and if any of you ever come to see me I will show you something that will surprise you. In conclusion, I want to take the other end now. I want to say, advertise early morning and late; but if you think by putting in a small "ad." in one of your papers you are going to get any result from it, you will be mistaken. You should take advantage of the facilities offered by "ad." writers, such as mentioned by Mr. Britton; and I think if we were to pick out 500 non-consumers on our lines of mains, and would publish once a month a small circular, in less than a year we would have results which would astonish us. I think that is the very best method, outside of a fine display; clean, up-to-date, right in the place where you are doing your business; not across the street. I consider the place to sell your stove is right at your place of business. We are fast making innovations in the gas light world, as you are thoroughly aware. The inventors to-day are taking such gigantic strides that it keeps a gas man guessing all the time to know what he shall do next. You are all aware we have some new arc lights out, and I see these incandescent arcs all up and down the streets. That is the most up-to-date system of electrical illumination we have to-day I suppose. Yet, if any gentleman here is conducting or is in any way interested in an electric light company, in conjunction with the gas end of the business, I will sell him as many incandescent arcs at $10 apiece as he will agree to take. I have them on my junk pile; on my back shelf. And it is the gas arc that has done it. Advertise, I say; but see that these gas arcs are not allowed to be in the condition that I have seen some of them on my journey. The condition in which I have found them is a disgrace to whoever is responsible for putting them on the market. They are dirty and filthy, and the electric canvassers say they will not remain in a month; but I have displaced at least 250 electric arc lights, in a town which has the cheapest electric light in the State, in the last 4 months. We have now an outside lamp, and I was very glad to see them outside when I came into this beautiful office. If you gas men want to lick "the stuffing" out of the electric light men, push the gas arc and push a man with it. If it is in a saloon burning many hours, see that it is clean, and if they won't clean it you clean it every week, and if they won't put new mantles in you put new mantles in, but charge a rate that will pay you in the end. That is, in my mind, the way to conduct your business—on business principles. Push it. Advertise it in all legitimate ways—some newspapers, some circulars, and cooking demonstrations. But in all instances conduct your business on business principles, and the result will be success. (Applause.)

Mr. Britton—I am sorry to know that my lecture on liberality has not affected my friend from Spokane any better than it did, and I want to put on the blackboard an illustration of my scheme for selling old junk, so as to convince you it is a good proposition. Eleven dollars and 35 cents apiece represents the cost to the Company. The probable average cost of putting them up, including the old stoves I sold by the bunch, I will estimate at $6, or $17.35 that those stoves cost the Company placed, not counting the cost of the meter. If I take the cost of the meter and its connections, which will probably be $7.25 more, that would be $24.60 entire cost to the Company for an investment proposition. We don't put in services. The consumer pays for them, and in 95 per cent. of the cases the services are already in and paid for. The average consumption of the number of stoves out (something over 6,000) will run pretty close to 2,000 feet of gas per month for each, and it is safe to say the new ones will average 2,000 feet a month, and assuming 500 stoves were put out at 2,000 feet per month, we have a million feet of gas per month that will be sold through those stoves, with no additional cost to the Company for distribution. Your office force is not increased, neither is there any cost to you in any way for outside distribution, nor for manufacturing excepting the mere cost of material. Assume that a party can get $1 per 1,000 for fuel gas, and assume also that your gas cost you 50 cents in the holder—I do not suppose it costs any company more than that—there is a profit of 50 cents per 1,000 made upon each stove. I got $7.90; that is $16.70 that the stove cost. Every month it yields a revenue of 50 cents per 1,000. These stoves yield that revenue, or $500; in 12 months, $6,000. Those 500 stoves (for the sake of figuring) cost $8,350. There is a profit of $6,000 the first year. If any gas company wants more than 75 or 80 per cent. profit upon its money it might better go into some other business.

Mr. Aldrich—It is pretty good on the blackboard; but it doesn't pan out.

Mr. Lowe—Where did you get those electric arc lamps, Mr. Aldrich?

Mr. Aldrich—They were bought from the Washington Water Power Company, who paid $23.50 each when they purchased them. I made an equal exchange for them.

Mr. Lowe—You gave them a gas arc in exchange for an electric lamp, and threw the electric lamp on the junk pile?

Mr. Aldrich—I put them in the front window. That is what I call a junk pile. They are of no use to me. I will sell them to you for $10 each, and they cost you $17 laid down in San Francisco.

Mr. Lowe—But you consider it a most excellent investment to exchange an incandescent gas lamp for an electric lamp?

Mr. Aldrich—I can find a sale for them.

Mr. Lowe—Would it not then be a good plan to exchange a gas stove for a coal stove and find a sale for your coal stove? The best managed businesses in the world are the enormous department stores. There are classes of people who do not buy bargains, and there are also people who wait for bargains, and we all know that these enormous, magnificently managed establishments find it to their best advantage to have occasionally a clearing-out sale. It is not a question of clearing-out old stock so much as selling leaders, getting people to come to their establishment, making people familiar with the article they have on sale. They may apparently lose thousands of dollars, but in reality they make a great deal of money in doing it, and I think that is exactly what Mr. Britton has done in his case. My experience has been that anything you give to the public is not appreciated. If you give them a stove, as soon as it gets a little bit old they want you to give them a new one.

Mr. Aldrich—Last fall I put in a great many Welsbach lamps free of charge, and as soon as the mantles were worn out they want d us to put in new mantles free of charge. I gave them the mantles and changed tactics, putting the price back so there would be a profit on the mantles, and now they are buying their mantles and paying for them.

Mr. Osborn—I move a vote of thanks to Mr. Valentine for his valuable paper.

Mr. Britton—I second the motion, but before it is put I would like to correct a possible impression—I don't know how it may have struck the minds of some of the members that all the stoves which I sold were junk. I happened to state in a conversation between Mr. Lowe and others last night that I had gotten rid of some old stoves. I did not take 1,000 old junk stoves and make 485 out of them. I suppose out of that number of stoves sold possibly 425 were new, of the makes of 1901 and 1902. The others were good stoves that had been damaged in transit, as they all will be more or less, a casting broken, or an oven damaged, or a door broken. Those were made into good stoves. So, as a matter of honest fact, there were not *any* junk stoves sold. I would not put out a poor stove, because it is the poorest advertiser a gas company can have; but they were stoves I could not have sold except at that price. As to the matter of gas arcs, we take care of them in our town at a number of places where they have a great many of them, upon the payment to us of so much per 1,000. If a man pays us $1.25 for his gas we charge him $1.28 per 1,000 for whatever he may use in the gas arcs, and for the extra 3 cents, say 3½ cents per 1,000, we take care of his arcs in the way of renewing his mantles or cleaning his lamps.

The motion extending a vote of thanks to Mr. Valentine was carried.

The President announced that the next thing in order was the paper by Mr. Frank J. Symmes, of San Francisco, on the subject of

## MUNICIPAL OWNERSHIP.

In the absence of the author the President called upon Mr. John A. Britton to read the paper, which Mr. Britton did as follows:

An ever-recurring question before the American municipality is, "Who shall own and operate the so-called public utilities?" If it becomes settled as to one utility, a new one comes into the field. How may the people secure, at the lowest price and of the best quality, those first essentials to life and comfort—water, light and transportation; for these are the first utilities which demand a settlement, and they are promptly followed by others of less importance, but equally effective for political purposes. Any service to the people which requires the use of the public street becomes a public interest and justifies a reasonable public control; first, the necessity, afterwards the luxury. From the growth of a community to that of a village comes, first, the demand for a common water distribution, then follow the gas pipes, car tracks, electric wires for light and telephone service, and at last appear pipes for steam transmission. Although not generally known in many American cities, steam is now conveyed from central stations through the public streets for house warming and for power purposes, and it is safe to predict that within a reasonable time we may transmit a cooling medium in the same manner. The ice man will lose his importance, and be largely displaced. The citizen, by turning a valve, will "cool off" his refrigerator much as he now heats up his radiator, and by means of these same pipes the atmosphere of his residence may be cooled at will.

In this development of the town or city the man or corporation who first brings these utilities within the citizens' reach is regarded as a public benefactor. Later the citizen regards such enjoyments as his prerogatives, claims the right of control, and at last condemns them to public ownership. Private capital was ready to invest in these utilities before the city or town was prepared to assume them, and, as an encouragement to the private investor, and an aid to "infant industry," first franchises have often been granted with compensation. In time the privileges increase in value, the street becomes occupied by other utilities, the public is incommoded in its street travel, the private corporation is criticised and condemned and public antagonism is aroused against it. The municipality seeks control by legislation, and unscrupulous legislators either attempt to "get even" on the monopoly or to "cinch" it for private gain. When agitation over these questions becomes frequent and violent, prejudices are aroused and good government is disturbed. Amid the controversies bad blood is stirred, political issues are made over them, the private corporation is charged with bribery and corruption, and the remedy claimed is public ownership. Any fair sized city, not yet the proud possessor of its water or gas works, not yet having tasted the experience of public ownership of a great utility, thinks it "*Must have them.*" Like the Pears' soap baby in the bathtub reaching out for the soap cake, it can't be happy till it gets it. In time, however, the city discovers that municipal administration is not well adapted to this kind of responsibility, and after financial waste, extravagance and political corruption the utility becomes run down and neglected, so the last step is to lease the public utility back to private management where business methods and honest administration can prevail.

Cities and towns are to be found in this country to-day, in all the various stages of this experience, suffering from *private* ownership and from *public* ownership, and the last stages of their troubles are often worse than their first.

There is some thing very attractive about this public utility cry. It appeals to many classes of men. The capitalist knows he can make money out of it, the politician thinks he *ought to;* if honest he would make it for the public, if dishonest he would make it for himself. For the socialist it serves as a text for all his theories, for the demagogue it proves his best political capital.

The capitalist knows from experience that he can conduct the business affairs of the great gas, water or railroad company far more economically than the public official can, and that the difference is a handsome profit. He knows that the properties increase in value with the city's growth, that the business itself increases, and that with the advancements come a diminished rate of expense. He knows that no other investment is safer and surer of its income if it be permitted to enjoy the natural profits which should come of it, and, notwithstanding the uncertainties of legislation and municipal control, he still remains faithful to it. All these investments under good management rank up next to the bonds of the National Government.

The public utility is also equally attractive to the politician and to the office holder. It gives them fine opportunities to become conspicuous and to appear important. It offers many places to be filled, much money to be handled, fine opportunities for *honorable* distinction, and still greater and finer ones for plunder. It gives to the corner groceryman, whose acquaintance with the affairs of these institutions has been restricted to a payment of $1.50 a month, a glorious chance to say how these great properties, involving ten, twenty or fifty millions of dollars, should be handled. The office holders present and prospective may be counted upon to advocate public ownership. They *may* advocate public ownership with a view to saving to the people the profit of the private corporation, and the possibility of securing such a result is a justifiable ambition and just stimulant to the aspiration; but, too often, alas! it is supported from other motives.

To the demagogue the public utility comes as a gloricus blessing. It serves for his chief political thunder; it is his greatest stock in trade. He holds it up as the greatest public enemy, continually threatening the welfare of the people—the most wicked of trusts. It is the red rag with which he may rouse the socialistic bull, incite the ire of the crazy anarchist, and by it whip their votes into line. It is for him a beautiful hobby upon which to ride to glory—and to a higher office.

To the plain, honest citizen the public utility is a large and complicated piece of machinery necessary for the use of the people. It is to convey to him an abundance of pure water from the distant springs or reservoirs of nature, to manufacture and deliver to him a good quality of artificial light, to provide the best possible facilities for travel about the public streets, and to do all these and other things at a reasonable cost. He realizes that, whether this is done for him by the wicked corporation or by the extravagant municipality, he is too often an unnecessary sufferer. He knows that any change may be but the shifting from one to the other horn of his dilemma, and he knows further that he is not always so great a sufferer as he is told.

What is expected of the wise citizen is that he should not be misled by the wild cry of the politicians whose palms are itching for plunder—for such there are; that he should ignore the rapacious cravings of the wicked corporation and the greedy capitalists—for such there are; and that he should be uninfluenced by the high ambitions and the virulent attacks of the demagogue—for such there are; and that he should see for himself fairly, judge calmly, discern truth and demand justice clearly, and then to stand by them firmly and persistently. If he would do all this he should heed the Chinese maxim, "Hear both sides and all will be clear; hear one side and you will still be in the dark." He will find the public utility question a very practical one, and there is more to be learned from the experience of others than from the most extended study of its theoretics.

He must, therefore, seek his information from all sides. He must study the most successful examples, and ascertain the causes of their success; he must investigate the greatest failures and discover the reasons for failure. He may find both success and failure under the same system, but he must discover the reasons for both.

He will find in the public mind two radical and extreme views upon the subject, with a growing tendency toward public ownership. He will find good and wise men presenting strong arguments that the State has no right to take up *any* business that the private citizen can perform, and he will find other men who believe that the government should perform them all, an extreme of socialism reaching to complete paternalism. As usual, reason and good judgment will be found along the broad, middle path. This sensible man will waive all preconceived ideas, discard all prejudices and judge the facts free from bias of every kind. If he is seeking after truth he will not endeavor to *make out a case.* He will not magnify or exaggerate the advantages of one side, nor ignore nor avoid them on the other. He will avoid the methods of the attorney to bend every advantage to his side, to smuggle in all that can help his case and seek to rule out all that can injure it. He will not play upon the pride, the passions, the prejudices of others, or yield to any such qualities himself. There is no criminal to be saved from the gallows at any cost. He will act the part of judge and jury; he will deal only in justice, fairness and truth.

He will find this question clearly a business one, not complicated by religious, philanthropic or charitable considerations, entangled only by political ones. He must seek to free it from these. The public utility cannot succeed anywhere unless it can be honestly and efficiently conducted, and wherever it fails under public ownership politics is the cause of it. It becomes a *moral* question only to the extent that any good business transaction is a moral question, that it is a practical application of true ethics, and demanding a careful discrimination between right and wrong. It is only thus far that we can go in our de-

mands upon our public servants or upon the private corporations. It is of no consequence to us whether our officials are "High Church" or "Low," "Catholic" or "Protestant," and we need not know whether they are Republican, Democratic, Prohibition or Socialistic, so that they are faithful, honest and efficient, conducting their public duties well.

The true value of the public utility lies in the management, not in the ownership. Whoever can operate these institutions so as best to serve the public need is the owner of the public wants, and is entitled "to have." Whoever can furnish the necessities of life so that the poor may obtain the most for their slender means may be considered the proper owner. If the State can perform this service better than any other the State should undertake it; if, on the other hand, the State attempts it and fails it should return to private control.

The question is, can the street car accommodations, the telephone service, the light, the water, aye, the milk and the bread, be furnished to the people through the city government better and cheaper than through private enterprise? It matters not to the consumer where the title to the property lies, who owns the car tracks, the telephone wires, the water pipes or the milk cans. It is good car and telephone service, good light and water, milk and bread at the lowest rates which the consumer needs and is entitled to have. It matters not to him whether the water comes from Lake Tahoe or Lake Chabot, or whether the street car in which he rides bears the name of the "United Railways," or is emblazoned with the great seal of San Francisco, so that he obtains the best possible service at the lowest possible price. We must not be diverted from this point. Results we want, not methods. Municipal ownership and management may be far better than private ownership; it may be far worse. We want the best.

If we would gain from others' experience we must ascertain how the work has been conducted elsewhere; but when we come to study other situations we must be careful not to be deceived by them, for each situation has its own special conditions. San Francisco or Oakland should not be misled by what may have been successfully done in London, Glasgow or Kalamazoo. Each city has conditions distinctly its own, so probably no precise parallel could be found. London has cheap gas, for there coal is cheap—only one-third the price it is here; Glasgow has cheap water, for there the rainfall is 60 inches in a year, and in that ancient city a sunny day is a curiosity. The streets are never sprinkled; less than 30 days' water storage is required. Here we have always a long, dry season, are liable to a succession of dry years, and a 3-years' water storage is required.

The advocates of public ownership can point out many cities where great and wonderful benefits have been derived from that system, while the other side may offset it with an equal number of instances of glaring robbery and political corruption under the same system. Individual examples are of little value, unless the conditions are the same, and many examples even may prove misleading.

Mr. Carroll D. Wright, the United States Commissioner of Labor, recently issued his "Fourteenth Annual Report," treating entirely of water, gas and electric light plants. In it are 975 pages of tabulated statistics, concerning 2,353 institutions, not quite one-third of the total number in the United States, and 42 per cent. of these are under municipal ownership. The reports are most elaborate and carefully classified, yet a full investigation of this volume fails to satisfy any positive claim on behalf of either side. The Commissioner cautions the reader against a "Careless comparison of the various plants." The varying conditions are such that a complete knowledge of each must be had in order to form a fair judgment. All the facts go to prove that it is not a question at all of who owns the plants, but as to what are the varying conditions and how are the plants conducted.

Some years ago there lived in New York city a well-known wit, whose name was Travers. He was afflicted with an unfortunate stammer. After a short time of residence in the great metropolis he was met by an old friend from his former city, who ventured to remark that his stammer seemed to be worse than when he lived in Baltimore, whereupon Travers replied, "Y-y-e-s; b-b-b-igger city." There are many other things which grow worse as the city grows bigger.

Public ownership finds its severest test in the big cities, and its greatest successes are always found in the smaller places. Good public management is best acquired when the city is young. The bigger the city the "b— bigger" the undertaking of acquiring the utilities, the "b— bigger" the risk in management, the "b— bigger" the waste, the "b— bigger" the chances of corruption, and the "b— bigger" the opportunity to hide a fraud from the people.

In the small city or town the public official is ever before the public eye. He realizes his responsibility, and his public pride and patriotism are stimulated by contact with his fellowmen. He becomes known to the people; he realizes his duty to his neighbor and his friend and he live up to it. The bigger the city the further the public eye becomes removed, the weaker becomes its vision, and the more easily it is blinded. Responsibility to a great number weakens the tie, and civic pride and patriotism waste and disappear.

In an address upon this subject, before the "Merchants' Association," Prof. Babcock declared that, whilst the Croton water works had not escaped its share of the political corruption, extravagance and mismanagement from which New York city had suffered, its management had been regarded as "generally satisfactory." And yet, within two weeks from that time the "Merchants' Association," of New York, published a "Report showing discrepancies in city revenues," in which it was shown that, for a term of 12 years, covering the period of its experts' examination, there was an actual deficiency in the city's returns from the Croton water works of $4,107,372. The value of the metered water reported by the chief engineer during this time was $11,246,162. During the same period, the Registrar, through whose office the collections were made, accounted for but $7,138,790, which sum not only included the amount of his collections but the amount yet due the city and returned by him as arrears. A great number of the meters were never read; presumably those used by the friends of the administration. This number of unread meters increased steadily in the 12 years investigated from 35 to 1,577 in number, and the discrepancy between the revenue, due from the quantity of water reported by the Engineer as having passed the meters, and the revenue actually accounted for by the Registrar, ranged from $271,000, as the smallest deficiency, to $477,000, as the largest deficiency for a single year during the period of investigation.

In nearly every case of the so-called successful public ownership—as in the case of the Croton water works just quoted and the well-known instance of the Philadelphia gas works—only a part of the story is told, only a part of the expense account is admitted, and the bookkeeping is juggled in nearly every instance in order to give an apparent profit. A common example given of a fine system of public ownership and management is the National post office department, and yet old Californians can recall how, when the first government rate of postage was 3 cents, we were glad to pay Wells-Fargo 5 cents for a better service, out of which sum received by them they paid 3 cents to the government, and then performed the better service for the remaining sum—two-thirds the government rate.

The instances of economical and efficient management of common business transactions by city, State or National governments are rare, and when the contracts are let out to private parties evidences of fraud are continually reported.

When we are told that the city can manage these utilities better, and are given alluring pictures of how much can be saved to the people, we must not be misled by the seductive allurements of first figures. Every man knows that he cannot possibly foresee the end in a great enterprise. Few men can build a house, or indulge in any scheme, even under their own best management, and come out according to the first estimates.

Under city management the situation is far more uncertain, and we must look at great municipal ventures with exceeding caution. We are in the position of the little girl who, hiding behind her father's chair and trembling with fear at a big mastiff, was told by her father not to be frightened; for did she not perceive that the dog was wagging his tail? "Yes," she replied, "I see his tail go; but that is not the end I was afraid of."

We judge what people can do and what they are likely to do by what they have done, not by that which they say they can do. Let me cite just one instance of what San Francisco has done. The city built a city hall. On April 4, 1870, the Legislature passed an enabling act providing for the sale of the city hall lots in Yerba Buena Park, and for the construction of a new city hall, at a cost not to exceed $1,500,000, the building to be erected and completed within three years of the passage of the act. Everything looked serene and the mastiff wagged his tail good-naturedly. The building was turned over to the city, July 1, 1899; not in 3 years, but after more than 29 years, and the mastiff had bitten us to the tune of $5,723,987, nearly four times the estimated cost. Can we do any better if we undertake a 20 or 30-million dollar enterprise now? And there are no better business men nor more upright and honorable gentlemen now than most of those who served for 29 years on that City Hall Commission. Is it not better, then, to bear the trifling ills we have, from the great utilities in their present hands, than to fly to those far greater ones that we know not of? It is the "other end we should be afraid of."

Our neighboring city of Santa Rosa wanted its own water works and, by special election in 1893, voted to issue $165,000 in bonds for the construction of the same. Bids were called for and two were submitted; one for $164,500, another for $161,000. It afterwards proved there was collusion between the bidders, and the successful bidder was to sublet the job to the other for a sum "not to exceed $120,000." The courts were called in, the bonds were declared void by the Supreme Court, and new ordinances and bonds were issued. There was continuous litigation. The City Council repeatedly changed the plans, always in favor of the contractor, to the extent of $9,000. The pumps had to be altered and moved at an expense of $4,600. The Council released the contractor from his forfeit, and returned to him his deposit check for $10,000. The reservoir cracked and leaked when the water was turned in, and extras were granted to the amount of $1,286, covering work which was in the original specifications.

On January 2, 1896, the Council hastily accepted the works, to preclude the filing of suits to prevent. At this time the private water works had 1,050 connections. The city attempted to supply 650 of these consumers, but failed, and during the first 10 months became a customer of the old company to the extent of nearly $1,200.

The judgment of the Supreme Court was that the original contract was null and void, and the city absolved from all liabilities; that the bonds were unlawfully and fraudulently disposed of, and that the Mayor, Council, Treasurer and contractors were liable in the sum of $165,701.25. It was decreed that an accounting should be had of the actual value of the works and the judgment entered against the officers and contractors for the difference between a proper valuation and the sum of $165,701.25.

Judge Daingerfield, presiding in the case, found that the works could probably have been built for $79,000, but were worth much less because of faulty construction. A jury, however, was found that was able to value the works at $190,000; but "the other end" in Santa Rosa is not yet, for a suit for $100,000 damages against the city has quite recently been entered by the old company.

The good city of Boston, Mass., yielded recently to the seductive wagging of the mastiff's tail and attempted many reforms in the direction of municipal ownership. She established bureaus of stationery and printing, carpenter work, electrical construction and repairs, and even an ice plant for cutting and storing ice for the drinking fountains. It was the highest ideal of municipal ownership ever attempted in America, and established under a mayor of unquestioned character and ability. It took but 2 years to discover "the other end" in Boston, and when the mastiff was unloosened from his grip the city found that her ice had cost $60 a ton, when the ordinary rate was from $2 to $3, and that every one of her bureaus was costing her from 25 per cent. to 50 per cent. more for their results than if she had depended upon private ownership. There was no embezzlement, no charges of genuine dishonesty; only natural municipal waste and extravagance. The new mayor asked the head of a bureau to tell him how many men could be spared without any harm to the efficiency of his bureau. The next day he brought a list covering one-third of his force. The bureaus have been closed down, and the estimated saving in the first 6 months was between $500,000 and $600,000.

It may be noted that among the various public enterprises water works have more often escaped mismanagement, but the example of New York is now prominent before us, and St. Louis and Cincinnati cannot count upon continued safety in this department if all the rest of the government is bad. Men are not corrupt and dishonest 6 days in the week and entirely virtuous and upright on the 7th. Neither will political thieves permit the water works to escape their attention indefinitely if they already operate in the other branches of the city government.

About the best instance of efficient public ownership and mismanagement that I have been able to find is that of the Boston subways, a series of tunnels made for the purpose of relieving the congestion from street car traffic upon the street surface. The city was authorized to issue bonds for the purpose of its construction. The governor of the State appointed a commission of 5 members for 5-year terms, at a salary of $500 each. The estimate made in 1894 upon the subways proposed was $5,000,000, and the net cost, when in operation in 1899, was but $4,141,896. The first year's traffic showed 50,000,000 passengers carried at a rate of between 7 and 8 miles per hour, where the surface travel had been but 2 miles per hour, and the income from the railway company leasing the tunnel will pay the interest and sinking fund to the extent that, when the bonds expire, principal and interest will be paid and the city will own the subway without the actual investment of a dollar. This is an ideal example of good public service, but it reflects upon the ability and good judgment of the governor and his commission and not upon a city management or contract. There seems no good reason why the people should not have many other instances of such management.

In Europe public ownership of these utilities has proven a success in the great majority of instances, but the conditions are in nearly every case found vastly different from ours.

No fair minded man can ignore the fact that public ownership has in many places proved a complete success, but it never occurs without honest management, good technical skill and the best of civil service. If one is tempted to quote many cases of unsuccessful public ownership and find not all of their successes, let us remember that it is the bogs and pitfalls only, we have to fear, not the smooth easy paths; that it is the seductive apple, the alluring women, the tempting office and the wicked corporation. All of these we must learn to stand up against. We need not concern ourselves over our virtues, they will take care of themselves; our faults are the things we must strive to correct.

No State in the Union has less need for public ownership of these properties than California, for she has already the best kind of control. Our Constitution requires the supervisors to set the price which the private utilities may collect for their water and their light. If the people are not well served it is the fault of the public officials who make the price. This is far better than ownership.

If the retail merchant could walk into the wholesale warehouse and name the price which he should pay for his goods; if he could declare the wholesaler's profit he would never invest his own capital in order to carry a stock. Would he not be too glad to escape all the risks of ownership? Let me but make the price on the articles I buy and I care not who may own the stock.

No matter how complete has been the success of public ownership in many cases, may we not conclude, from the sad experience of those who are glad to recede from it, from the fact that California already has the chief advantages without the risk, and from the fact that we have not yet learned to conduct our present affairs economically and well, that public ownership here may properly and wisely be postponed and certainly most carefully considered.

I am not so sure of the conditions in other cities on the Coast, but I do know that now, in San Francisco, the city is not badly oppressed by the private corporations, and not in a position to perform the work better. She needs other things much more. She needs better schools, streets and sewers. She needs a more generous public spirit and a more harmonious action amongst her citizens. She undoubtedly needs some kind of treatment – to go on a milk diet, perhaps—the milk of human kindness. We need to stop finding fault with each other and to make the best of things. We need to work together for good, and the newspapers should work together to help us. We are not half as bad as we make ourselves appear. Officials are not all corrupt and corporations are not all thieves. Every good deed helps us and helps the city, though it be but a little at a time; and every selfish and unfair act and every unnecessary advertising of our sins hurts our city; perhaps but a little at a time, but an injury all the same.

A full and fair investigation will show that gas, water, telephone, telegraph and railroad companies can almost invariably be conducted more economically and more efficiently under private than public ownership. But we are told that in the case of the private ownership the profit goes to the corporation and but a limited number are benefitted, whilst all the people are *contributors*. Under public ownership this profit would be equally or proportionately divided with all the people; assuming always that the efficiency would remain the same. But under public ownership we find a great municipal waste which may more than offset it, hence it becomes a question of corporate profit versus municipal waste and extravagance. If corporate profit is reasonable there might be no just grounds for a change; if municipal waste can be reduced to a minimum there may be many and good reasons for the public ownership. As it is, economical public service can seldom be found, and never in this country counted upon, and private management, if under public control, seems the wiser plan. The question is for the municipalities to first secure a wise and honest administration of their present affairs, after which and in due time all of these things may be safely added unto them, to prove themselves faithful over the few things that they may become proper rulers over many things.

The whole question resolves to a *matter of men*. It is the *kind of man* which tells the story for good or evil in the world, whether he be in public office or private corporation. Men of noble character will not rob the people, whether they occupy a chair in the city government or command the powers of a great monopoly. Here as everywhere comes

the cry, then, for men of high and pure character. If great and good things are to be performed great and good men are needed to perform them. It is "the man behind the gun" who determines the range, the direction and the result of his shot, and it is the man behind the office who is to determine for us whether public or private ownership is the better. And until we can secure equally good men for public as for the private office, the private corporation has the advantage.

If I owned San Francisco, and had unlimited credit, I would not think of buying out or assuming the care or expense of the public utilities. The public is not oppressed by them, and they are already under control. There are 70 millions already invested in these enterprises, and I would take the benefit of it. If I took it away from them, much of that capital would disappear from the city. I would sit with these wicked people in a fair and honorable spirit, determine between us what would be just rates to insure them 5 per cent. income on their investment, and agree upon a rate for 20 years. I would stop "nagging" them and let them alone.

I would borrow a hundred million dollars and start in to make San Francisco what should be—one of the largest and most beautiful cities on the globe. I would spend 5 millions on the water front and invite the ships of the world to come to us. I would have the streets so fine and clean that even Paris would come to see and enjoy them. I would have every pipe and wire carried in open tunnels beneath the sidewalks, and the streets should be undisturbed. I would have trees and plants and flowers to beautify the city in every direction, until it became one of the "show places" of the world.

In the year 1900, 240,000 people crossed from this country to Europe; four-fifths of them were Americans going abroad to spend money. They spent there not less than $200,000,000. Inside of 10 years I would have half of them coming this way. Inside of 20 years I would have 100,000 American visitors and 50,000 foreigners. If they spent $200 apiece I would have $30,000,000 a year income from them alone. San Francisco should show her pace, and the population and its business would double in two decades.

When the Almighty excavated this wonderful Bay he provided dock and harbor facilities for 10,000 vessels, and He expected us to build and use them. When He surrounded it with these beautiful hills He looked down upon them and beheld that they were good. He did *not* expect us to tear them away and slice them up. He expected that we would know enough to preserve and beautify them, else they would have been given to Chicago or New Orleans, where the people would pay $100,000,000 apiece for them. When a generous Providence fed our Bay, by the bounteous rivers flowing from our magnificent mountains through the richest and most fertile of valleys, it was believed that we would learn to utilize these waters and not permit them to go to waste and destruction. When He gave to California (and to no other people on earth) the redwood of the Coast, and the Sequoia of the Sierras, which with Omnipotent Power required from 1,000 to 7,000 years in construction, it was expected there would be a wise and intelligent people here to care for and enjoy them. When we were given the vine and fig tree, the orange, lemon and olive, fruit, flowers and grain enough for ourselves and half a world besides, it was expected that we would become a happy and industrious people upon this wonderful garden spot. It was surely fitted for the wisest and best people on earth.

California should endeavor to live up to those expectations. We should justify this wonderful heritage, and whether the people own the water, gas and railroad properties or only control them, is of little consequence if we can only learn to live together in peace and harmony, enjoying the blessings we have and bringing blessings to each other, with hand or heart turned against no man, and with charity to all and malice toward none. Doing these things we shall find it easy to build up great and beautiful cities for a happy and prosperous people.

*Discussion Postponed.*

The President—Is there any discussion to be had on this paper?

Mr. E. C. Jones—We have listened to a most magnificent paper by Mr. Symmes, who is considered by all San Franciscans best able to treat the subject of municipal ownership. This paper has been a treat to me personally, as I know it has been to all of our members. It will add another bright spot to the "Transactions" of the Pacific Coast Gas Association, and we should all be thankful to Mr. Symmes for helping us out during this meeting in such a splendid way. Therefore, I rise to offer a vote of thanks to him for this paper.

Mr. Britton—I am ready to second that motion, but I trust a discussion of the paper will not close with a vote of thanks. I think that is one of the subjects to which we should give the most particular attention; but as it is too late this afternoon to open the subject, I suggest that a discussion of the paper be postponed until to-morrow, to be taken up at some hour convenient to the members. I have one or two thoughts I would like to put forth on that subject, and I want to get them off my mind; but I don't want to detain you after a long reading of this most interesting paper, and I think the discussion might well go over till to-morrow. I second Mr. Jones' motion.

The motion was duly carried.

The President—The discussion of the paper will be postponed.

The President introduced Mr. E. C. Jones, of San Francisco, who read the following paper on

## AN EXPERIMENT ON THE PRINCIPLES OF PURIFICATION.

Without attempting to cover the field of gas purification historically, still it is necessary to review some of the most important employments of materials since the successful use and revivification of oxide of iron, in 1849, in order to show the reasons for present experimenting.

It is well known that the most efficient purification of gas from all its impurities in one stage purification was accomplished by the milk of lime method; this, for well known reasons, was abandoned in favor of lime in drier condition and of oxide of iron. The early forms of "dry" lime purifiers were of large area, and containing many thin layers of lime. This applied equally to the first use of oxide of iron, and it was found that if the purifying material was used in layers of more than 6 inches in thickness, it caused inconvenient back pressure.

More intimate knowledge of the process of purification developed the fact that in nearly every instance the back pressure was caused by imperfect condensation, which permitted tar and condensible vapors to go forward and fill the interstices of the lime or oxide. Oftentimes a thin layer of naphthaline crystals would completely seal the lower surface of the purifying material, regardless of its thickness. These conditions call for treatment outside the scope of purification. And it is now an accepted fact that purifying material, to perform its function well, must be kept clean and free from tar or oily matter by complete condensing and scrubbing of the gas previous to entering the purifiers. Clegg, in his Fourth Edition, 1866, says: "One bushel of quicklime, when slacked and reduced to the proper consistence for use, will have its bulk doubled, and that quantity will then spread over a surface of 25 square feet, 2½ inches deep, which is about the thickness found best in practice. When, however, economy is not the first consideration, that thickness may be reduced and the surface proportionately extended, *for the greater the surface the more effectual is the purification.*"

Also, Mr. Alfred King has ascertained that "A much larger surface is requisite with the oxide of iron method of purification than with lime, under equal velocities of current." Later writers speak almost entirely of large surface and slow speed for good purification, and quantity of material seems to be a secondary consideration.

You are all familiar with the old rule which gives the minimum purifying area as 9 square feet per 1,000 cubic feet of gas to be purified in 24 hours, and the following rule from "King's Treatise on Coal Gas": "When there is intended to be 4 purifiers, 3 always in action, the maximum daily (24 hours) make of gas expressed in thousands, multiplied by the constant .8, will give the superficial area of each purifier. For example, it is required to know the proper area of each of the 4 purifiers in works equal to the production of 400,000 cubic feet of gas per diem, then $400 \times .8 = 320$ feet superficial area of each vessel, and is 320 = say 18 feet side of square purifier."

Area alone seems to be considered by these writers, and no reliable information is given as to the thickness of material safe and economical to use.

Following ancient accepted methods, the purifying houses of to-day cover large areas with comparatively shallow boxes, but as it has come to be recognized as good practice, these shallow boxes, instead of containing many thin layers of oxide, were fitted with two thick layers, and finally with one set of trays near the bottom of the box and one layer of oxide, whose depth is only governed by the height of the box. The complete filling of purifiers with oxide, two, three and even four feet in depth, has not appreciably increased the back pressure, nor has it thrown more work on the exhausters at an expense for fuel or attendance.

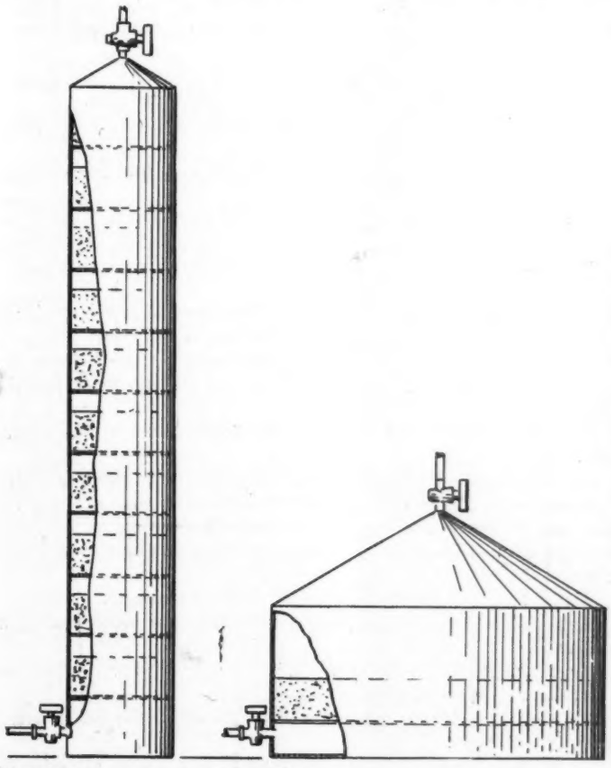
Recent developments in form of purifiers point to the saving of ground room and the adoption of tower purifiers, as well as tower scrubbers (the use of the word "tower" must not be misconstrued), and the writer has in mind a square or cylindrical, sheet steel tank, of considerable height and containing a large quantity of oxide of iron on small floor area, and hermetically sealed without the use of the water lute. This form of box would of necessity require convenient means of

cleaning and the revivification of the oxide in place. It would seem from the results of recent experiments that the form of purifier in almost universal use is the least well-adapted in shape for efficiency in purification.

In some recent experiments, which prompted the title of this paper, the writer had made two galvanized iron purifiers cylindrical in shape. One has an area in cross-section of 100 square inches, and contains one tray of wire gauze which holds $1\frac{5}{16}$ inches deep of oxide of iron, equal to 131 cubic inches, and weighing 2 pounds. The other purifier has an area of 10 square inches in cross-section, and contains 10 trays of wire gauze, each containing $1\frac{5}{16}$ inches in depth of oxide, and in all 131 cubic inches, weighing 2 pounds.

Each cylinder is provided with an inlet at the bottom and an outlet at the top. Great care was taken to carefully screen 4 pounds of oxide of iron of good quality, and made from the formula given by the writer, in a paper on "Purification," read before the Association in 1894. The purifiers were filled with this oxide, evenly spread on the gauze trays, and precautions were taken to avoid any by-passing of gas around the purifying material.

In conducting the experiments a 7,000 cubic foot holder was filled with unpurified gas of unchanging composition. The crude gas contained 180 grains of sulphuretted hydrogen per 100 cubic feet, as determined by C. C. Tutwiller's apparatus. The crude oil was passed through



the flat purifier at a rate of 1 cubic foot per hour; it then contained 30 grains of sulphuretted hydrogen per 100 cubic feet. After passing through the long purifier at the same rate of flow, the crude gas was completely purified, showing no trace of sulphuretted hydrogen. Repetition confirmed these results. The same amount of gas had passed through the same amount of iron oxide in the same time, yet in one case it was thoroughly, and in the other very imperfectly, purified. These results lead to the conclusion that oxide of iron may be used to better advantage in purifiers of less costly construction and occupying much less floor space.

These experiments were made possible by the use of the apparatus designed by Mr. C. C. Tutwiller, for the rapid determination of sulphuretted hydrogen quantitatively.

This apparatus is probably used by many of the gas companies in this country, and its value duly appreciated, but it is sufficiently new and interesting to warrant the writer in bringing a set of the apparatus to this meeting for your inspection.

The foregoing experiments are simply the beginning of a series along new lines, and may seem too meager to form the subject of a paper for our Association, yet the results are given with the hope of furnishing a nucleus around which may gather some new ideas on the subject of purification.

*Discussion.*

Mr. Lowe—I think it would be an excellent thing if Mr. Jones were to explain to the Association his experiments in connection with this subject. I think we would have a better understanding of it after listening to his paper.

Mr. Jones—This purifier (pointing to article) is described as the broad purifying box in my paper, and contains one tray of wire gauze containing exactly 2 pounds of oxide of iron evenly spread, and no chance for by-passing of gas. The other purifier contains 10 times as many trays, with the oxide evenly spread on each tray, but the amount of oxide in each tray in the large and small purifier is exactly the same depth, the weight of oxide was the same, and the rate of flow of gas through each purifier was the same, and the foulness of the gas—that is, the amount of sulphuretted hydrogen contained in the crude gas—was the same. Yet the small purifier, which is comparable to the purifiers in ordinary use in the gas works of to-day—that is, the shallow purifier—did not purify the gas. The purification by this purifier would not be satisfactory to any gas company nor to any inspector of gas; but by the use of the same oxide in the smaller purifier I obtained perfect purification, and at the outlet of this box there was no trace of sulphuretted hydrogen at any time.

Mr. Lowe—I understand that while the amount of gas that passed through the two purifiers was the same as determined by the meter, the rate of flow or velocity was 10 times as great in one box as in the other.

Mr. Jones—Yes, sir; because you have cramped the area and increased the height of the oxide 10 times with the same amount.

Mr. Lowe—Your experiment would seem to upset the prevailing notion that large purifiers, or large flat vessels with great area, are necessary for the purification of gas. Your experiment would seem to indicate that the construction of purifiers of to-day is incorrect.

Mr. Jones—It seemed so to me, and that was the prime cause of the experiment to determine it.

Mr. Eichbaum—According to your experiment, it would seem that the essence of purification is the passing through a number of layers, because in that case you have 10. Now, in a great many places where they use 3 purifiers at once they have 6 layers, and it would seem therefore, to be the case that in these flat purifiers of the old style that you speak of that we are nearly all using, the excellence of the operation consists in having a number of layers through which gas passes just as they are. Now, your flat purifier did not purify the gas, because there was only one layer, but in this high one you have 10 layers, consequently the lower one was foul and the upper ones gradually purified the gas as it passed up. It would seem to me, therefore, from your experiment, that if some means could be devised similar to the tall purifier you speak of, the process would be entirely successful and might be a great improvement. The only drawback to it is the difficulty of handling the oxide in that way.

Mr. Britton—It seems to me it does not appear to be a question of the quantity of oxide at all that affects the purification, because your gas passes through the same quantity of oxide in the one that it did in the other. There was no difference in the quantity.

Mr. Jones—The explanation seems to be that each molecule of gas containing sulphuretted hydrogen comes in contact with more particles of oxide of iron.

Mr. Britton—Have you tried the experiment of having a less quantity of oxide in your tall purifier?

Mr. Jones—No, sir; I have not carried the experiment to that point. I was afraid the question might arise that I was reverting to old systems, but I had not that in mind. In putting the 10 layers in here, we might consider this 20 or 30 feet high, and each layer 2 feet in thickness. In that case it might be necessary to sustain the oxide by artificial means; that is, by a series of trays, to avoid the downward pressure which might possibly pack it at the bottom so there would be back pressure from it. But the 10 trays were put in here in order to subdivide the oxide into layers of the same thickness as in the larger box.

Mr. Eichbaum—While we are speaking of different apparatus, I devised some 25 years ago a revolving purifier, in which the oxide was continually being fed in through a shield and the cylinder on such a slope that it would gradually work out at the bottom and then drop into a receptacle, moved by a screw and be brought continually back; but never having carried it into effect I cannot speak of its results, though I have no doubt in the world that it could be done and at the same time kept perfectly sealed so there would be a continual passage of gases, a continual passage of oxide dropping through the gas, the gas being delivered and the oxide going to the end and back continuously. I never carried it into practice because I never was able to, and I never had a patent for the appliance, but I put it before witnesses so as not to be

precluded from using it if I wanted to. There are so many purifiers in the market it is hard to say which is the best, and I regret to say you do not offer any solution of the difficulty by presenting any means by which your plan of purification can be carried out, and I would like to hear if you have any.

Mr. Jones—I do not claim it as my plan of purification, in the first place. It is simply a curious experiment in purification, which shows me when I am going to build a purifying house I need not buy 3 or 4 acres of land and contract with somebody to build expensive boxes with all the dangerous devices connected with the old-fashioned plan of purification. We are using apparatus in our gas works to-day that were invented by Winsor. You find them illustrated in "Accum" in 1819, the first book published on gas appliances. There seems to me to be no reason why purification cannot be conducted in closed vessels, without the dangers attending purification to-day, nor why it cannot be carried on in towers through thick bodies of oxide of iron and revived in place.

Mr. Eichbaum—How did you enter the tower of the purifier?

Mr. Jones—A tower of this kind would have to be supplied with manholes and plates, and some sort of conveying device or stages for handling it, but it is not anticipated that the oxide will have to be removed often.

Mr. Eichbaum—Unles it is permanently foul?

Mr. Jones—Yes. I have used one set of purifiers for 2 years without renewing, without taking out a pound of the oxide, unless the accretion of sulphur in the body of the oxide should necessitate the taking away of some of it, because the oxide increases in weight and volume as the free sulphur is thrown aside.

Mr. Aldrich—They were not in action all that time continuously?

Mr. Jones—Not continuously, of course. They were changing about by the old method.

Mr. Eichbaum—I am not speaking of removing the trays for the purpose of reviving the oxide, because that has been done here for many years. As to not taking the oxide out for 2 years, I know it is feasible, but the difficulty of unloading the tower when the oxide was permanently foul and no longer capable of taking up sulphur is what I referred to. Have you ever noticed in this very foul oxide crystals of yellow sulphur all through the oxide?

Mr. Jones—I cannot say that I have.

Mr. Eichbaum—On one or two occasions I have actually seen the sulphur.

Mr. Jones—I always supposed the sulphur was so finely subdivided it could not get together.

Mr. Eichbaum—I have seen in very old oxide the sulphur itself in minute particles all through the oxide.

Mr. Foveaux—In the experiment there you have made with the tower purifier, you remember the construction I made in 1898 of that purifier; the rectangular purifier with layers.

Mr. Jones—I do not recollect the design of it.

Mr. Foveaux—It was a kind of box containing 4 layers of the oxide being 15 feet high, 6 feet wide, and 45 feet in length on the ground, which was equivalent to the area we had to have under the old system.

Mr. Jones—When you say the area we had to have, I think it is what we might call a barbaric hypothesis. It has lived down to this day. I think a great many of these old rules have been accepted and lived up to for the reason that some fellow away back has said it was right to do it, and we have not taken the pains to determine why, or whether it is right or not. Undoubtedly a purifier constructed as you suggest would do good work.

Mr. Papst—What area of cubic feet is necessary per 1,000 feet of gas in this purifier?

Mr. Jones—That I have not determined.

Mr. L. P. Lowe—It strikes me the limit of size of a purifier is determined by how high you want to go. For instance, if you are satisfied to build a purifier 15 feet high and do not want to go any higher you must proportion your diameter to the height. The cheapest construction undoubtedly is a round tower, and if you build it 15 feet high you must have a certain diameter to handle a given quantity of gas. If you put it 30 feet high you can lessen your diameter. If you build it 30, 50, 60, 70 or 100 feet high you can still lessen your diameter and do better work. There is, of course, a reasonable limit to which a man can construct anything and handle it nicely. I presume a tower purifier 25 or 30 feet high would be about as high as one would want to build it. Then the area of that purifier would be determined by the amount of gas you wished to handle. There is no question at all in my mind but that the tower purifier will do very much better work, the reason for it being, no doubt, that the gas is brought into more intimate contact with the purifying material; in other words, it is broken up. It seems to me the cheapest purifier would be a round purifier, running it well up into the air, and it would use very little ground space. It is a little inconvenient in handling the oxide, but by adopting Mr. Jones' method of revivification you can leave it in there for a number of years with very little trouble. I think we are putting about 5 times as much money into our purifying plants as need be, and by doing so we are getting only about one-half the efficiency we should have.

Mr. Hollidge—I will ask Mr. Jones if there was any trouble from naphthaline at all due to revivification by steam jet?

Mr. Jones—It would be impossible to have any trouble from naphthaline due to the steam, because while the oxide of iron is revived in place the steam does not come in contact with it at all. It is so arranged the steam does not come in contact with the air inside of the purifier, nor the oxide of iron, nor the purifying material itself. It simply acts as an ejector to draw down the air, and that steam, with the foul air from the purifier (the air which has done work of revivification), passes out through the waste pipe; so I don't see how there could be any trouble from naphthaline through reviving oxide in place.

Mr. Hollidge—I would say the year before I first came down here I tried revivification with steam from a steam-jumper, and I never changed my purifiers for about 6 months, and I began to be troubled with naphthaline in the yard. I emptied all the trays and found the bottom of the purifier was smothered with naphthaline, and from that hour I discontinued the steam use.

Mr. Jones—Were you using a steam jet exhauster?

Mr. Hollidge—Yes; I was using a steam jet at that time.

Mr. Jones—That might cause a naphthaline deposit in the purifier. That would be most likely.

Mr. Hollidge—I have also used it in water gas, and found the same thing, and that is what cautioned me.

Mr. Jones—That was probably due to the mechanical effect of steam condensing and dragging down with it the naphthaline, depositing it at that place. Oftentimes the deposition of naphthaline crystals at that place is due to rapid condensation.

Mr. Hollidge—I have no doubt Mr. Jones has had more experience in steam revivification than a good many of us. I only had one year of it, and after I found this deposit of naphthaline in the bottom of the purifiers I immediately discontinued it, and had no more trouble on that score.

Mr. Jones—That could not have been the cause of the naphthaline.

Mr. Eichbaum—When you speak of steam in connection with the purification, in Mr. Jones' plan the steam does not come in contact with the oxide at all. Now, in your case did you undertake to blow the air through with steam, or did you draw it through in the same way Mr. Jones did?

Mr. Hollidge—I did the same as Mr. Jones mentioned.

Mr. Eichbaum—I thought perhaps the steam had some contact with the oxide.

Mr. Hollidge—Not a particle.

Mr. Lowe—Were you using a steam jet?

Mr Hollidge—I was not using a steam jet at all the last time I was making water gas.

Mr. Lowe—Were you putting in steam in your gas at all prior to it?

Mr. Hollidge—No, sir.

Mr. Lowe—And yet you got the naphthaline deposit?

Mr. Hollidge—Yes; I guess I got 2 coal shovels full out of the bottom of the boxes, and it scared me. I began to get afraid of it because I saw it on top of the boxes, too.

Mr. Jones—Prior to your naphthaline trouble you removed the oxide every time it was foul and took it out of doors?

Mr. Hollidge—Yes.

Mr. Jones—Then the naphthaline must have come from some other source, and the fact you left the oxide in a greater length of time, because it had a better opportunity to accumulate at that point.

Mr. Hollidge—I have not had any since.

Mr. Jones—You were taking your oxide out and stirring it up and the naphthaline was mixed with your oxide.

Mr. Lowe—I think you were very lucky that you found it in your box instead of in your street mains.

Mr. Hollidge—Yes; and it was very lucky I discontinued it.

The Chairman—This very interesting discussion will have to close, I regret, because it is getting very near time to adjourn.

Thereupon on motion an adjournment was ordered until Wednesday, at 10 o'clock A.M.

[To be Continued.]

## The Losses Through the Anthracite Coal Strike.

The *Metal Worker* says that from week to week there are published estimates of the cost of the anthracite strike which make a brave showing and look decidedly complete and fair. The loss of wages to the men is figured out, which we suppose may be done pretty closely. We are told how many millions of dollars the coal companies and the railroads lose in profits, which may or may not be wide of the mark. Quite a display of millions is made over the loss of business of local merchants and other incidental matters. Now all these statistics are based on the assumption that every ton of anthracite coal not mined during the strike represents just so much total loss, and this, in the face of the fact, only too well known, that the one serious feature of the anthracite coal mining industry is that the men are employed less than 200 days in the year, and that the capacity for production of the collieries is greatly in excess of the demand. In other words, the strike is causing idleness which would have occurred in any case, and when the mines do start up they can and probably will produce a good deal of the coal on which our statisticians figure such great losses.

The anthracite coal industry has had serious losses during the struggle. Every ton of bituminous coal burned by consumers who ordinarily use anthracite is business lost, with the chance that some customers may have been taken away forever. But the great mass of the requirements is simply in suspense, and this is particularly true of the domestic demand, which will not be seriously felt for some time to come. Instead of entering the winter with enormous stocks, as usual, the anthracite trade will have many months of work at maximum pressure, and will have then to fill the yards and storage plants so utterly depleted. The sacrifices which the manufacturing industries, and notably the Eastern iron trade, have been forced to make are serious enough and the anthracite mining industry must suffer keenly, but it is ridiculous to parade the huge figures which the amateur statisticians are putting forward. They absurdly exaggerate the situation and contribute to the feeling, only too prevalent, that a great industry and all those connected with it have been seriously crippled.

## Are We Too Prodigal?

Mr. E. T. Clarage, writing in *Iron Age* respecting the question named in the heading, says: Illustrating the tendency of the times is the story of the manager of a large mercantile business who wanted to hire an office boy. He had two applicants to whom he stated that he was busy for the moment, and asked them to open two packages while they were waiting. One of the boys patiently untied the string, wound it up neatly, took off the paper wrapper and folded it up nicely. The other one simply whipped out his pocket knife, cut the string, tore off the paper, threw it into the waste basket and laid the contents before his employer before the more methodical boy had the first knot untied. I leave it for you to decide, which boy got the place, though I think most modern business men will agree that time is worth more than paper and string.

But the question is, are we not carrying this too far? A short time ago I saw a mass of tangled telegraph wire that the linemen had simply thrown in a ditch. It was cheaper to use new wire than straighten out the old. The way we squander iron is astonishing. Get on a street car in any large city and count the pieces of iron you see lying in the street in a journey of only a few blocks. String and paper we can produce as long as the soil lasts, but how about iron and coal?

During the year 1901 in the United States alone we robbed the earth of nearly 29,000,000 long tons of iron ore, or about 812 pounds per capita. Our product of pig iron was nearly 16,000,000 long tons, or about 448 pounds per capita.

Large as this seems, it is nothing compared with our consumption of fuel, the total coal mined during the year reaching the enormous amount of 292,000,000 tons, or 7,300 pounds for every man, woman and child in the country. Think of a pile of coal weighing 2,000 pounds, then imagine 1,000 heaps of this size in a row, then think of 1,000 rows; then, if possible, think of 292 times this amount.

Without doubt, in spite of our prodigality, a considerable proportion of the iron is collected in the shape of scrap and given back to us in different form. The junk dealers may be a blessing to posterity.

With coal it is entirely different; when once used it is gone forever. Probably not over 10 per cent. of the stored power in the total coal mined is made available for man's use. At least 90 per cent. goes up the stack in smoke or waste heat. So bountifully has mother earth supplied us with coal deposits that there has been little effort to reduce the process of combustion to such a scientific basis that there would be little or no waste of this precious heat.

Our consumption of coal and iron cannot be computed even for 100 years ahead, so great is the ratio of increase.

Vast though the deposits may seem, they are not inexhaustible, and one cannot help thinking that we are like the improvident parent who squanders his patrimony and leaves his progeny to shift for themselves.

## Incandescent Mantles under the Microscope.

The *Gas World* notes that Dr. C. Killing, of Düsseldorf, recently had a paper in the *Journal für Gasbeleuchtung* on the microscopic examination of incandescent mantles. This paper is copiously illustrated with drawings from the objects by Herr Gustav Prüter, Munich. Photography is not well adapted for this class of work, since only one plane of the object can be in focus at any one time; the artist, on the other hand, can keep his hand on the fine adjustment of the microscope and by racking the tube slightly up and down can examine all parts of the object so as to get a clear idea of its form, and then draw that. The specimens were mounted in Canada balsam. The principal fibers which have stood the test of experience are spun cotton, especially Egyptian, and China grass (ramie). When impregnated and dried a cotton fiber comes back to about the original diameter, and there is no appearance of crystalizing out nor any apparent difference in the fiber; the salts have sunk well into the protoplasm of the fibre and do not appear on its surface. When burned off the fiber appears uniform and fibrous in texture, and about 10 instead of 16-2500ths of an inch in diameter; and as a whole the fiber has become somewhat kinked. When the mantle is hardened at a high temperature the fibers become still more kinked, less transparent, less fibrous and still thinner (8-2500ths inch), and the substance presents numerous granules, particularly at the kinks. After 300 hours' use the fibrous structure has disappeared, the whole fiber is granular, still more opaque, and very kinky, and the diameter is reduced to 5-2500ths inch. As to the spun threads of a mantle, the spun construction is very open and plain after burning off, but begins to disappear even in an hour, and after 300 hours the whole thread shrinks into an opaque thing like a frayed rope; at these 3 periods the diameters are 272, 213 and 146-2500ths inch.

China grass differs from cotton in that its fibers are, along their length, very unequal in thickness; there are thick and thin portions in the same fiber. The general course of behavior of this fiber resembles that of cotton, but the original fibrous character of the burned-off ash disappears less readily. The China grass fibers are thicker than cotton fibers, and the whole mantle sits better in the flame and is much more durable, the falling-off in lighting power being materially less. The ash is slightly higher in China grass than in cotton, and as this ash is a little more alkaline than that of cotton fiber this may have something to do with the cohesion of the mantle. The China grass threads, on the other hand, remain looser in texture all through than the cotton threads do, so that the cotton offers more resistance to vibration.

Dr. Killing mentions, incidentally, that mantle ash is in steady demand, not only for recovering its thoria and ceria, but also as a polishing powder for gold; and the microscope very readily shows whether it is genuine or not.

## ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Mr. F. A. Lane has resigned the position of Superintendent to the Paducah (Ky.) Gas and Electric Light Company.

A Light, Heat and Power Company, to supply gas and electric currents to the residents of Baldwinsville, Lysander and Van Buren, N. Y., has been organized. The concern is capitalized in $100,000, and its headquarters are in Baldwinsville.

A correspondent in Sacramento, Cal., forwards the following: "The Board of Directors of the Sacramento Electric, Gas and Railway Company, held a meeting something over a fortnight ago—to be precise, the meeting was held on the 19th ult.—and Mr. Thomas Addison who had been President and Director in the concern for a number of years, resigned. Mr. Albert Gallatin was elected President, and Mr. John Martin was elected a Director to fill the vacancy on the Board occasioned by the resignation of Mr. Addison. The consolidation of the Capital Gas Company with the Sacramento Electric, Gas and Railway Company was completed at this meeting. Some time ago the Sacramento Electric, Gas and Railway Company exchanged its bonds for bonds of the Capital Gas Company to the amount of $150,000. These bonds

bore 6 per cent. interest. The Capital Gas Company has agreed to transfer to the Sacramento Electric, Gas and Railway Company all of its property, real and personal, franchises and assets in consideration of the cancelling of its outstanding bonds to the par value of $150,000. The Sacramento Electric, Gas and Railway Company owns all the capital stock of the Capital Gas Company. Some time ago it was stated that the Bay Counties Power Company had secured an option upon the control of the capital stock of the Sacramento Electric, Gas and Railway Company."

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ADVICES from Seattle, Wash., are to the effect that towards the close of August the shareholders of the Bellingham Bay Gas Company, which operates in the cities of Whatcom and Fairhaven, Wash., held a meeting at which it was determined to accept the offer made for the properties by Messrs. Cyrus Pierce & Company, of Philadelphia, Pa. The purchasers will assume control of the plant on or about October 15th.

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NOTABLE additions are being made to the main system of the Gilroy (Cal.) Gas Company.

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IT is reported that the proprietors of the Lowell (Mass.) Gas Light Company are about to apply to the Board of Gas and Electric Light Commissioners for the right to increase the capital stock in the sum of $500,000.

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THE Directors of the Mystic (Conn.) Electric and Gas Light Company have voted to increase the rate for an electric lighting supply to 15 cents per kilo-watt hour. The present rate is 12 cents, and the increase took effect September 1st. The reason for the advance is "the increased cost of coal and of other items entering into the production of electricity."

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THE Iowa Light and Heat Company is constructing a gas plant of the acetylene type at Gladbrook, Ia.

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THE proprietors of the Clinton (Mass.) Gas and Electric Light Company are proposing to extend the Company's mains to and through the streets of Lancaster.

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MR. R. W. WAITE, Secretary and Treasurer of the United Gas and Electric Company, of New Albany and Jeffersonville, Ind, has been appointed President of the Indiana Water Company, with the additional title of General Manager.

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AT the annual meeting of the Stockton (Cal.) Gas and Electric Company the officers elected were: Directors, F. A. Hihn, O. Eldridge, A. T. Eastland, W. J. Dutton, G. C. Hyatt, H. E. Adams and J. L. Eastland; President, F. A. Hihn; Vice-President, O. Eldridge; Secretary, A. T. Eastland; Superintendent, H. E. Adams.

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WRITING of Stockton puts us in mind of the fact that the Chamber of Commerce of that city is urging the authorities to construct and maintain an electric lighting plant on public account. In fact, the Chamber has gone so far in the premises as to pass a resolution urging the City Council to call a bond election for the establishment of such a system. The resolution is accompanied by a lengthy report from the Chamber's engineer, declaring that a suitable plant should cost not to exceed $120,000.

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NOT much progress of a nature favorable to the promoters of the scheme has been vouchsafed by the Board of Public Works of Columbus, O., to the petition for a renewal of the artificial gas franchise of the Columbus Gas Light, Coal and Coke Company.

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THE New Haven (Conn.) Gas Light Company has awarded a contract for the construction of a 4-lift holder, to rest in a steel tank, to the Riter-Conley Manufacturing Company, of Pittsburg, Pa. The vessel is to have a capacity of 2,500,000 cubic feet. It is to be located on the New Haven Company's East street property.

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"THE beauties of Spring Lake, N. J., are to be further developed by means of a recently incorporated Company, which is under the control of men whose names are famous in the current business annals of the United States. The charter under which it will operate entitles it to engage in any sort of business save that of banking. The scheme includes the construction of an up-to-date gas and electric light plant.—R. S."

A CORRESPONDENT forwards the following: "The explosion of a gas stove is the basis of a suit for damages recently brought in Kansas City, Mo., by Mrs. Beatrice Sexton, against the Kansas City-Missouri Gas Company. The suit is to be conducted in the Circuit Court, and plaintiff puts her damages at $10,000. She alleges that on March 8th, at her home, 1708 Harrison street, she attempted to light the burner in a gas cooking stove, whereupon the apparatus exploded with great force, scattering the fragments over the room. One of the fragments struck her on the head with sufficient force to fracture her skull. She alleges she had complained to the Company that the stove was out of repair, but that an inspector who looked it over declared that it was in good condition.

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MR. THOMAS NEVINS, President of the Haverhill (Mass.) Gas Company, died suddenly, at Mount Shannon, Ireland, the afternoon of August 21st. Deceased, who was in his 58th year, was in Europe with his son for the purpose of overlooking certain street railroad interests owned by him in Liverpool and Manchester. He had been very prominent and had acquired much wealth in the development of certain sections of East and West Orange, N. J.; also in the town of Ampere, the same State. His brother (Mr. P. J. Nevins) is General Manager of the Haverhill Company.

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MR. HENRY KURTZ and Samuel T. Heston still assert with positiveness that they propose to construct a gas plant in Princeton, Ind.

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THE following is the material text of the ordinance that has been granted by the authorities of Scranton, Pa., to the promoters of the opposition gas scheme for that city, the official title of which is the "Consumers Gas Company:"

Section 1. Be it ordained by the Select and Common Councils of the city of Scranton, and it is hereby ordained by the authorities of the same, that the Consumers Gas Company, of Scranton, Pa., its successors and assigns, be authorized and permitted and are hereby granted the privilege of erecting and maintaining works for the manufacture of gas, and of laying mains and pipes in the streets, avenues, courts, alleys, walks and public places in the city of Scranton, for the distribution of gas, and for this purpose to enter upon said streets, avenues, courts, alleys, walks and public places with its agents, workmen and employees, subject to the rules of the Department of Public Works, and under the direction and supervision of the Director of said Department.

Sec. 2. The said Company agrees to place the streets, avenues, lanes, alleys, etc., in which they lay pipes in at least as good a condition as they are previous to the commencement of work upon said streets, avenues, lanes, alleys, etc., for the laying of mains or pipe. And the said Company also agrees to assume all responsibility in the construction of its plant, and to save the said city of Scranton harmless from any damages arising from the laying of said pipes. Shall also indemnify the city for damages by leakage, and leakages of gas after the said mains of said Company are laid. All work on the public highways is to be done in accordance with the laws and ordinances of the city of Scranton and under the direction and supervision of the Director of the Department of Public Works.

Sec. 3. The said Company, when laying its gas pipe on any of the streets, avenues, alleys, places and courts on which the City Hall or City Police Station and fire engine houses abut, shall make proper connection with its mains, and furnish gas to aforesaid city buildings without charge to the city during the legal existence of the Company asking this franchise, or any Company that may hereafter operate under this franchise.

Sec. 4. And the said Company shall furnish a bond in the sum of $10,000 with at least two sureties, or a corporate bond of like amount to be approved by the City Solicitor, conditioned that the construction and operation of said Gas Company shall be in accordance with the provisions of this ordinance, and that said Company will observe and be subject to all ordinances of said city with reference to operating gas companies now in force or hereafter to be passed, not inconsistent with its charter rights and this ordinance. And any combination or consolidation of competing gas companies to which this Company shall become a part shall work a forfeiture of this franchise which shall thereupon revert to the city and the Company hereby authorizes and directs the City Solicitor, acting for her, to take the necessary legal steps to that end, and further agrees to waive any rights it may have to hold the same under any laws of this Commonwealth.

Sec. 5. The said Company shall within 60 days from the date of pas-

(*Continued on page 337.*)

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A. M. CALLENDER & CO.,
PROPRIETORS.

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EDITORS.

CHAS. E. SANDERSON,
MANAGER.

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NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.
AMERICAN GAS LIGHT ASSOCIATION.
WESTERN GAS ASSOCIATION.
OHIO GAS LIGHT ASSOCIATION.
PACIFIC COAST GAS ASSOCIATION

*Notification Respecting Advertising.*—Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co. 39 and 41 Chambers St.
*Germany*—Lemcke & Buechner, of New York.
*England*—Aug. Siegle, 30 Lime Street, London.

MONDAY, SEPTEMBER 8, 1902.

(*Concluded from page* 336.)

sage of this ordinance file in the office of the City Clerk an acceptance of the entire provisions of this ordinance. This ordinance shall not become effective or operative until said acceptance be filed as aforesaid, and the negligence or failure of said Company to file same within the time required this ordinance shall be null and void and of no effect.

Sec. 6. The said Company shall pay the city of Scranton the following sums of money to be paid as follows, to wit: In the year 1905 and every year thereafter 2 per cent. of the gross receipts of the said Company, to be paid on the first day of April in each and every year, but this shall not be in lieu of any license tax, but shall be considered a part of the same.

Sec. 7. That the said Consumers Gas Company shall within 2 years from the granting of this franchise have its plant so far constructed and its mains so far laid that it shall be prepared to furnish gas to 1,000 consumers, and shall within 7 years from the granting of this franchise have its works so far constructed and its mains so far laid as to furnish gas to 5,000 consumers, otherwise this franchise shall be void and of no effect.

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THE *Acetylene Journal* says that acetylene now commands active attention in all civilized countries. A recent report from Japan indicates that this illuminant is making much progress, both as regards the manufacture of carbide in that country and of providing equipments for installation. The fact that the initial cost of setting up a complete town lighting outfit, in the case of acetylene, is but a fraction of that of other modern equipments for the same purpose, tells as favorably, perhaps more so, for the gas in the Orient as in our own land. Wealth there is much less generally disseminated; and many a town that could not think of gratifying its ambition to have public lights before the coming in of acetylene, finds the way to such an end opening up easily, in view of the economical character of this illuminant. It may confidently be predicted that acetylene, in years to come, will cut a great swath in all parts of Asia.

## The Market for Gas Securities.

City gas shares failed to attract much attention last week, but there was no marked change in quotations. Consolidated closed to-day (Friday) at 223½ to 224. There is nothing in truth to say about the situation, other than to remrk that if a tremendous volume of business, all being done at remunerative prices, counts for better values, then Consolidated should be selling at figures well in advance of current ones.

Brooklyn Union is dull, and the quotations for it—240 to 250—are perfunctory. The k is very firmly held, for we know of an order for 200 shares at 246 or under that remains unfilled. As it is with the Consolidated from a business point of view so also is it with Brooklyn Union. Peoples, of Chicage, made a quick advance this week, going from 104⅛ last Friday to 109⅛ at the close to-day. Baltimore Consolidated also scored a sharp rise. It is 74 to 74½. There is quite a lull in the trading in Washington (D. C.) gas, but holders refuse to accept anything less than 377 for it. Cincinnati is a trifle weaker, at 100 bid. The outlook seems for higher prices all round.

## Gas Stocks.

**Quotations by George W. Close, Broker and Dealer in Gas Stocks.**

16 WALL STREET, NEW YORK CITY.

SEPTEMBER 8.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share.

| *N. Y. City Companies.* | *Capital.* | *Par.* | *Bid.* | *Asked.* |
|---|---|---|---|---|
| Consolidated | $73,177,000 | 100 | 223¾ | 224 |
| Central Union, Bonds, 5's | 3,000,000 | 1,000 | 110 | 112 |
| Equitable Bonds, 6's | 1,000,000 | 1,000 | 105 | .. |
| " 1st Con. 5's | 2,300,000 | 1,000 | 118 | 120 |
| Metropolitan Bonds | 658,000 | .. | 108 | 112 |
| Mutual | 3,500,000 | 100 | 350 | .. |
| Municipal Bonds | 750,000 | .. | .. | .. |
| New Amsterdam Gas Co. .. | | | | |
| Bonds, 5's | 11,000,000 | 1,000 | 112⅛ | 113 |
| Northern Union, Bonds, 5's. | 1,250,000 | 1,000 | 108 | 110 |
| New York and East River .. | | | | |
| Bonds 1st 5's | 3,500,000 | 1,000 | 112 | 113 |
| " 1st Con. 5's | 1,500,000 | | 109 | 111 |
| Richmond Co., S. I. | 348,650 | 50 | 100 | .. |
| " Bonds | 100,000 | 1,000 | 103 | .. |
| Standard | 5,000,000 | 100 | 130 | 140 |
| Preferred | 5,000,000 | 100 | 150 | 160 |
| Bonds, 1st Mortgage, 5's | 1,500,000 | 1,000 | 114 | 117 |
| Yonkers | 299,650 | 500 | 130 | .. |
| *Out-of-Town Companies.* | | | | |
| Brooklyn Union | 15,000,000 | 100 | 240 | 250 |
| " " Bonds (5's) | 15 000,000 | 1,000 | 119 | 119⅛ |
| Bay State | 50,000,000 | 50 | 1¾ | 2 |
| " Income Bonds | 2,000,000 | 1,000 | . | 75 |
| Binghamton Gas Works | 450,000 | 100 | 28 | 30 |
| " 1st Mtg. 5's | 509,000 | 1,000 | 93 | 96 |
| Boston United Gas Co.— | | | | |
| 1st Series S. F. Trust | 7,000,000 | 1,000 | 82 | 85 |
| 2d " " " | 3,000,000 | 1,000 | 47½ | 50 |
| Buffalo City Gas Co. | 5,500,000 | 100 | 11 | 13 |
| " " Bonds, 5's | 5,250,000 | 1,000 | 83¾ | 85 |
| Capital, Sacramento | 500,000 | 50 | .. | 35 |
| Bonds (6's) | 150,000 | 1,000 | .. | .. |
| Central San Francisco | 2,000,000 | .. | 106 | 108 |
| Chicago Gas Co. Guaranteed Gold Bonds | 7,650,000 | 1,000 | 104 | 104¼ |
| Cincinnati Gas & Elec. Co. | 29,500,000 | 100 | 100 | 100¼ |
| Columbus (O.) Gas Co., 1st Mortgage Bonds | 1,500,000 | 1,000 | 101 | 101½ |
| Columbus (O.) Gas Lt. & Heating Co | 1,682,750 | 100 | 88¼ | 89½ |
| Preferred | 3,026,500 | 100 | 107½ | 109 |
| Consumers, Jersey City Bonds | 600,000 | 1,000 | 102 | 103 |
| Consumers, Toronto | 1,700,000 | 50 | 218 | 225 |
| Consolidated, Baltimore | 11,000,000 | 100 | 74 | 74¼ |
| Mortgage, 6's | 3,600,000 | .. | .. | 118 |
| Chesapeake, 1st 6's | 1,000,000 | .. | .. | .. |
| Equitable, 1st 6's | 910,000 | .. | .. | .. |
| Consolidated, 1st 5's | 1,490 000 | .. | . | 112 |
| Consolidated Gas Co. of N.J. | 1,000,000 | 100 | 15 | 17 |
| " Con. Mtg. 5's | 380,000 | 1,000 | 85 | 87 |
| Consolidated G. & E. Co.'s., Little Falls, N.Y. | 90,000 | 100 | .. | 100 |
| Bonds | 75,000 | .. | .. | 100 |
| Detroit City Gas Co. | 4,825,500 | 50 | . | 89 |
| " Prior Lien 5's | 5,603,000 | 1,000 | 99½ | 100 |
| Detroit Gas Co., 5's | 382,000 | 1,000 | 77 | 79 |
| " Inc. 5's | 16,000 | 100 | 94 | 94½ |
| Equitable Gas & Fuel Co., Chicago, Bonds | 2,000,000 | 1,000 | .. | 101 |
| Essex and Hudson Gas Co. | 6,500,000 | .. | 34 | 38 |
| Fort Wayne | 2,000,000 | .. | . | |
| " Bonds | 2,000,000 | .. | 58 | 63 |
| Grand Rapids Gas Lt. Co. 1st Mtg. 5's | 1,225,000 | 1,000 | 104½ | 105 |
| Hartford | 750,000 | 25 | 245 | 265 |
| Hudson County Gas Co., of New Jersey | 10,500,000 | .. | 25 | .. |
| " Bonds, 5's | 10,500,000 | .. | 101 | 103 |
| Indianapolis | 2,000,000 | .. | 70 | 80 |
| " Bonds, 6's | 2 650,000 | .. | 102¾ | 104½ |
| Jackson Gas Co | 250,000 | 50 | 73 | 75 |
| " 1st Mtg. 5's | 290,000 | 1,000 | 101 | 102½ |
| Kansas City Gas Light Co., of Missouri | 5,000,000 | 100 | .. | 36 |
| Bonds, 1st 5's | 3,822,000 | 1,000 | 102 | 104 |
| Laclede, St. Louis | 10,000,000 | 100 | 88 | 90 |
| Preferred | 2,500,000 | 100 | 100 | 109 |
| Bonds | 10,000,000 | 1,000 | 109½ | 110 |
| Lafayette Gas Co., Ind. | 1,000,000 | 100 | | 60 |
| Bonds | 1,000,000 | 1,000 | 58 | 64 |
| Louisville | 2,570,000 | 50 | 112 | 120 |
| Madison Gas & Elec. Co. | | | | |
| " 1st Mtg. 6's | 350,000 | 1,000 | 107½ | 108½ |
| " 6 per cent. scrip, due 1910 | 100,000 | 25 | 25 | 87 |
| Montreal, Canada | 2,000,000 | 100 | 182 | 184¾ |
| Newark, N. J., Con. Gas Co | 6,000,000 | .. | 56 | 58 |
| Bonds, 6's | 4,600,000 | .. | 105 | 105¾ |
| New Haven | 1,000,000 | 25 | 300 | 325 |
| Nashville Gas Lt. Co. | 1,000,000 | 100 | 110 | .. |
| Oakland, Cal. | 2,000,000 | .. | 46 | 47 |
| " Bonds | 750,000 | .. | .. | .. |
| Peoples G. L. & Coke Co., of Chicago | 25,000,000 | 100 | 109¼ | 109¼ |
| Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage | 20,100,000 | 1,000 | .. | .. |
| 2d " | 2,500,000 | 1,000 | 104 | |
| Rochester Gas & Elec. Co. | 2,150,000 | 50 | 88 | .. |
| Preferred | 2,150,000 | 50 | 118 | .. |
| Consolidated 5's | 2,000,000 | .. | 87½ | 90 |
| San Francisco, Cal. | 10,000,000 | 100 | 48 | 48½ |
| St. Paul Gas Light Co. | 1,500,000 | 100 | 45 | 47 |
| 1st Mortgage 6's | 650,000 | 1,000 | 113 | 116 |
| Extension, 6's | 600,000 | 1,000 | 113½ | 115 |
| General Mortgage, 5's | 2,465,000 | 1,000 | 92 | 93 |
| St. Joseph Gas Co. | | | | |
| " 1st Mtg. 5's | 751,000 | 1,000 | 95 | 96½ |
| Syracuse, N. Y. | 1,975,000 | 100 | 27 | 30 |
| Bonds | 2,047 000 | 1,000 | 86 | 90 |
| Washington, D. C | 2,600,000 | 20 | 366 | 377 |
| First mortgage 6's | 600,000 | .. | .. | .. |
| Western, Milwaukee. | | | | |
| Bonds, 5's | 4,000,000 | .. | 109½ | 110 |
| Wilmington, Del. | 600,000 | 50 | 232 | .. |

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Consisting of generator, carburetor, superheater, seal, scrubber, condenser; two (2) 15-horse power engines; two (2) blowers, wall brackets, countershaft, belting, etc.

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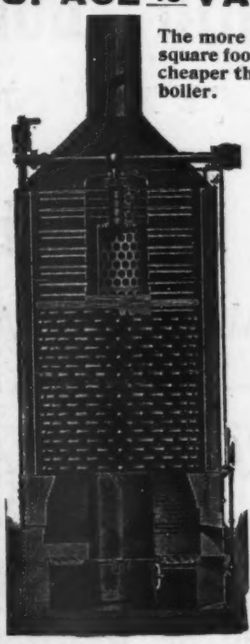

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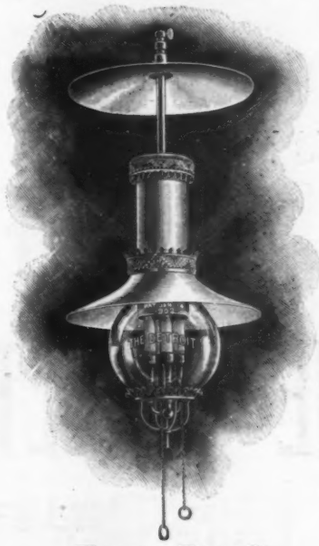

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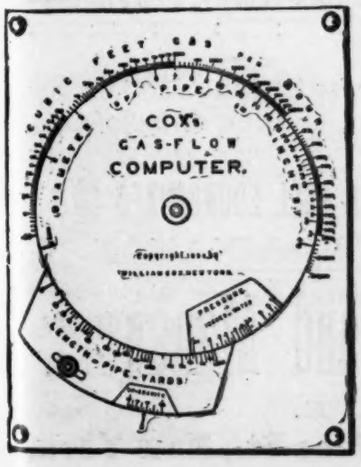


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what size of Pipe to use to convey any quantity of Gas, any distance, with any loss of pressure, and any initial or final pressure? Then use

**COX'S GAS FLOW COMPUTER,**

as it gives this information accurately at sight, without mental effort. No calculations needed. Saves time, money and mistakes.

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To Retain Fluid Material of Any Sort.

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BY UTILIZING A

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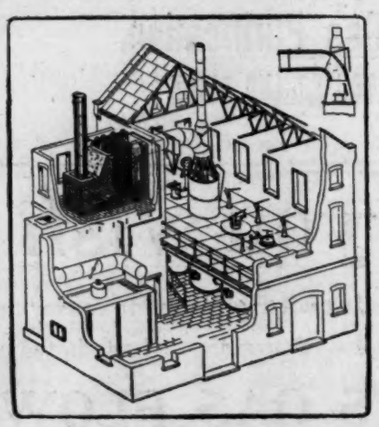

**To absorb the heat now going to waste when you blow through your superheater to heat the feed water for your boilers to the temperature of the steam. This is now being done at the Poughkeepsie Gas Works, Poughkeepsie, N. Y. : : : : :**

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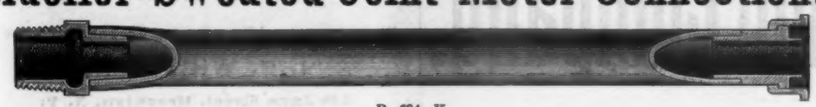

B—604—K.

HOW to get along with the least worry and make the most money is a problem that puzzles the best of us sometimes.

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**The Best Light in the World**

FOR LIGHTING

**Stores, Churches, Halls or any large indoor areas.**

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## Coal and Water Gas Plants.

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Gas Enriching Plants to Enrich Coal Gas up to 24 Candle Power, and Making a White, Bright, Non-smoking Gas.

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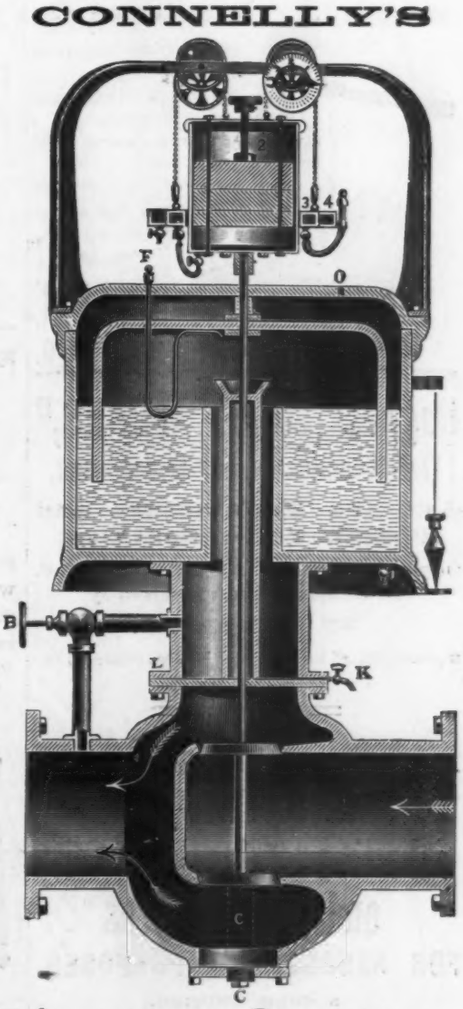


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Drilling and Tapping Pipe under Pressure

WITHOUT ANY ESCAPE OF GAS.

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*Machines Sent to any Gas Company for Thirty Days' Trial.*

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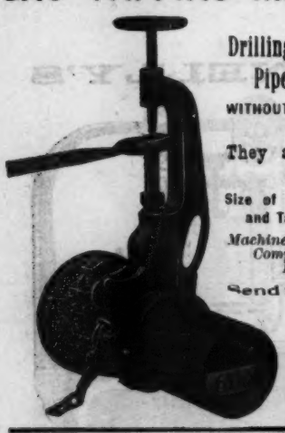

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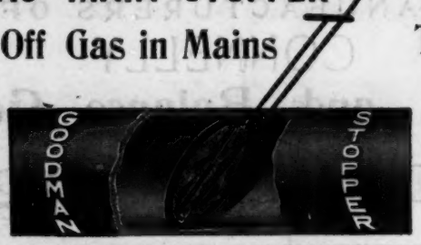


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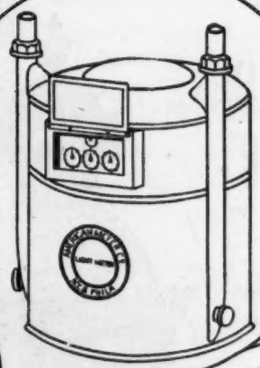
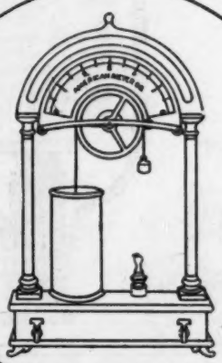
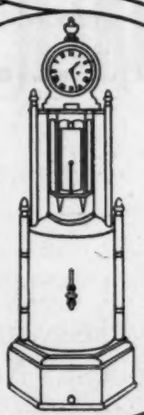
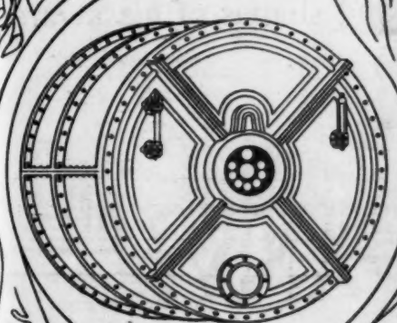
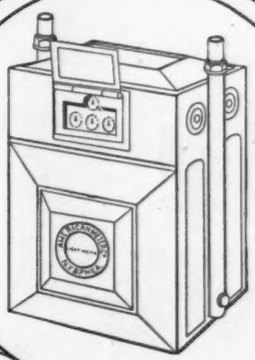
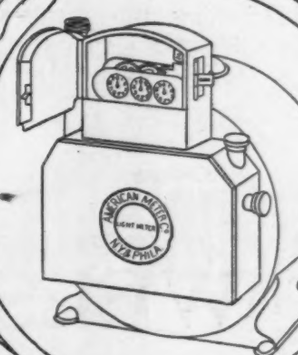












## PUBLIC LIGHTING TABLE.

### SEPTEMBER, 1902.

| Day of Week. | Date. | Table No. 1. Following the Moon. Light. | Table No. 1. Following the Moon. Extinguish. | Table No. 2. New York City. All Night Lighting. Light. | Table No. 2. New York City. All Night Lighting. Extinguish. |
|---|---|---|---|---|---|
| | | | | P.M. | A.M. |
| Mon. | 1 | 7.00 PM | 4.30 AM | 6.30 | 4.20 |
| Tue. | 2 | 7.00 | 4.30 | 6.30 | 4.20 |
| Wed. | 3 | 7.00 | 4.30 | 6.15 | 4.30 |
| Thu. | 4 | 7.00 | 4.30 | 6.15 | 4.30 |
| Fri. | 5 | 7.00 | 4.30 | 6.15 | 4.30 |
| Sat. | 6 | 7.50 | 4.30 | 6.15 | 4.30 |
| Sun. | 7 | 8.30 | 4.40 | 6.15 | 4.30 |
| Mon. | 8 | 9.10 | 4.40 | 6.15 | 4.30 |
| Tue. | 9 | 9.50 FQ | 4.40 | 6.15 | 4.30 |
| Wed. | 10 | 10.40 | 4.40 | 6.05 | 4.40 |
| Thu. | 11 | 11.30 | 4.40 | 6.05 | 4.40 |
| Fri. | 12 | 12.30 AM | 4.40 | 6.05 | 4.40 |
| Sat. | 13 | 1.30 | 4.40 | 6.05 | 4.40 |
| Sun. | 14 | 2.20 | 4.40 | 6.05 | 4.40 |
| Mon. | 15 | 3.30 | 4.40 | 6.05 | 4.40 |
| Tue. | 16 | No L. | No L. | 6.05 | 4.40 |
| Wed. | 17 | No L. FM | No L. | 5.55 | 4.50 |
| Thu. | 18 | No L. | No L. | 5.55 | 4.50 |
| Fri. | 19 | 6.30 PM | 8.10 PM | 5.55 | 4.50 |
| Sat. | 20 | 6.30 | 8.40 | 5.55 | 4.50 |
| Sun. | 21 | 6.20 | 9.30 | 5.55 | 4.50 |
| Mon. | 22 | 6.20 | 10.20 | 5.55 | 4.50 |
| Tue. | 23 | 6.20 | 11.10 | 5.55 | 4.50 |
| Wed. | 24 | 6.20 LQ | 12.10 AM | 5.40 | 5.00 |
| Thu. | 25 | 6.20 | 1.20 | 5.40 | 5.00 |
| Fri. | 26 | 6.20 | 2.20 | 5.40 | 5.00 |
| Sat. | 27 | 6.20 | 3.30 | 5.40 | 5.00 |
| Sun. | 28 | 6.10 | 5.00 | 5.40 | 5.00 |
| Mon. | 29 | 6.10 | 5.00 | 5.40 | 5.00 |
| Tue. | 30 | 6.10 | 5.00 | 5.40 | 5.00 |

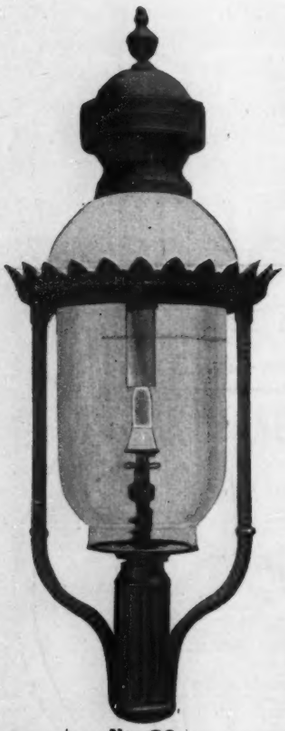
### TOTAL HOURS LIGHTING DURING 1902.

| By Table No. 1. | Hrs.Min. | By Table No. 2. | Hrs.Min. |
|---|---|---|---|
| January | 238.30 | January | 423.20 |
| February | 196.20 | February | 355.25 |
| March | 196.20 | March | 355.35 |
| April | 166.40 | April | 298.50 |
| May | 151.40 | May | 264.50 |
| June | 131.10 | June | 234.25 |
| July | 142.40 | July | 243.45 |
| August | 162.00 | August | 280.25 |
| September | 179.00 | September | 321.15 |
| October | 216.30 | October | 374.30 |
| November | 224.10 | November | 401.40 |
| December | 250.00 | December | 433.45 |
| Total, yr. | 2255.00 | Total, yr. | 3987.45 |

NEW YORK, 33 Nassau Street. PHILADELPHIA, Broad and Arch Streets. CHICAGO, Foot of Orleans Street. BOSTON, 624 Tremont Building.
CLEVELAND, 809 Cuyahoga Building. ST. LOUIS, 712 Roe Building. SAN FRANCISCO, 712 Polk Street.

# WELSBACH STREET LIGHTING COMPANY

.... OF AMERICA ....



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Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

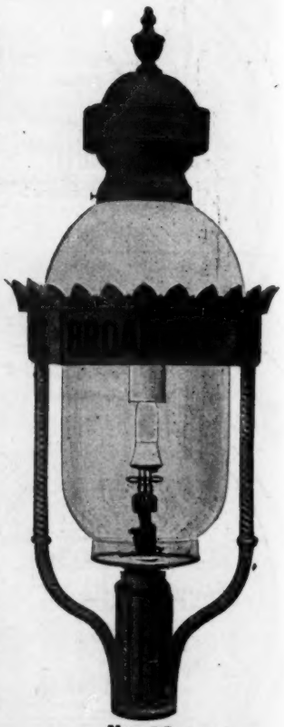
POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others Interested in Municipal and Outside Lighting.



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The most practical, efficient and artistic burner yet produced. . . . . .

It contains an improved adjustable Bunsen so constructed as to permit of a wide range of variations in gas pressure without blackening the mantles and without an adjustable air shutter. . .

It can be used with all styles and sizes of glassware, either shades or globes. No further necessity to carry a stock of different burners for the many sizes and shapes of glassware.

GAS COMPANIES AND DEALERS CANNOT FAIL TO APPRECIATE THE MANY SALABLE FEATURES OF THIS NEW BURNER.

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# LOWE WATER GAS APPARATUS.

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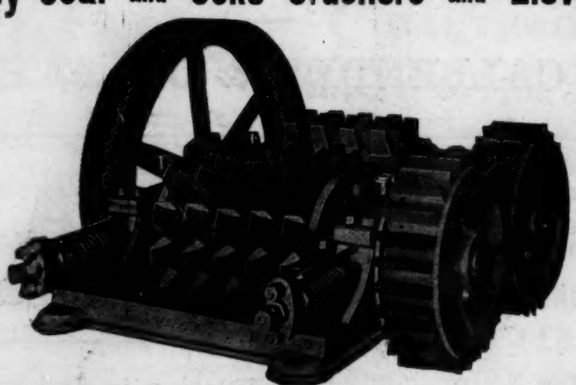

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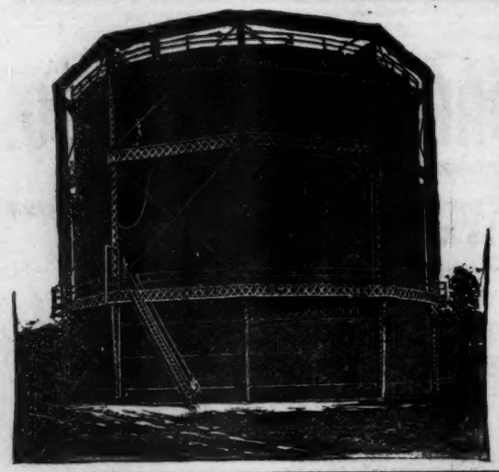

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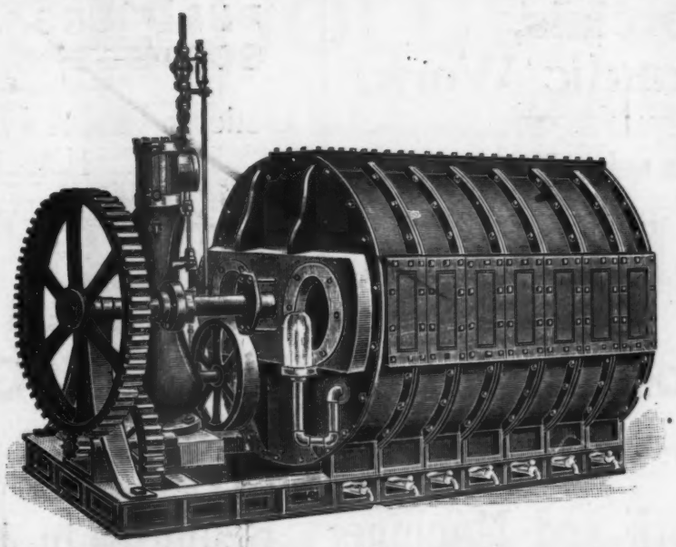

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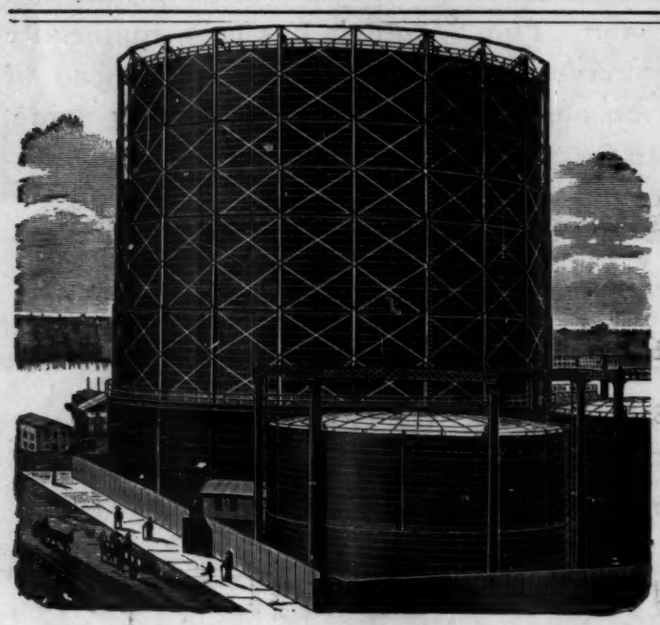

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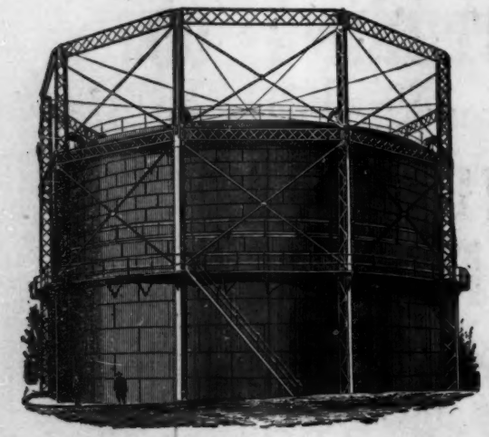

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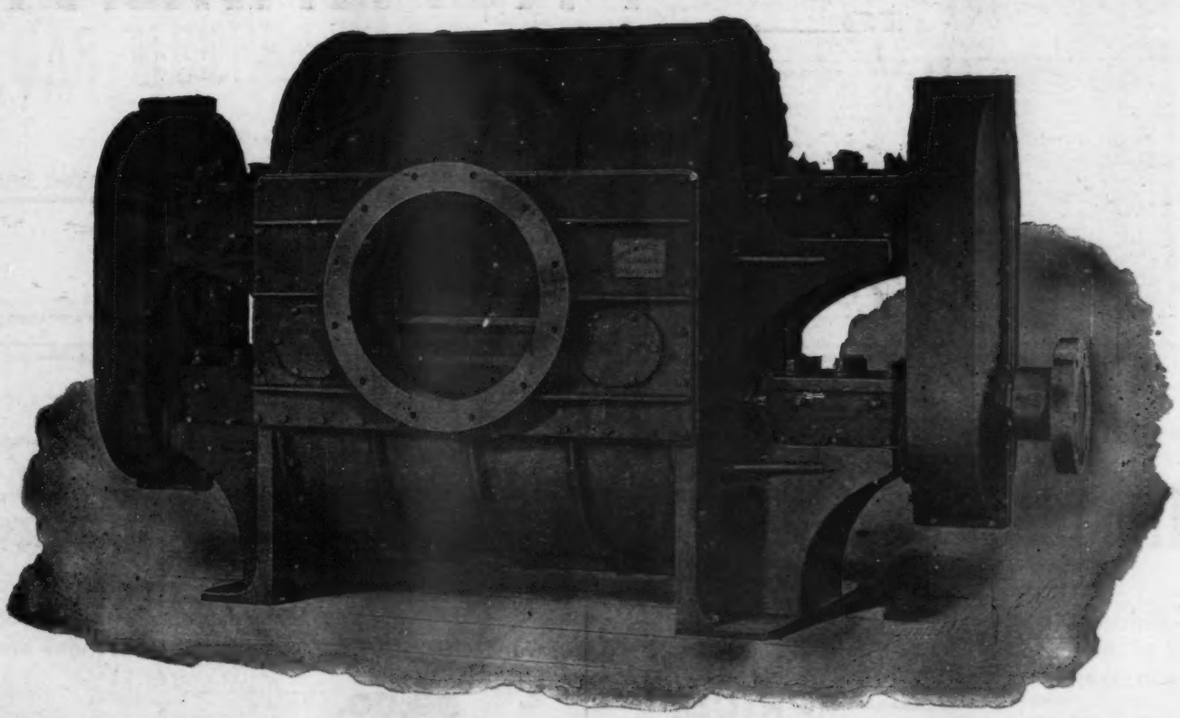

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